PRELIMINARY ENVIRONMENTAL INVESTIGATION REPORT

Proposed Aerohaven Park
Evesham Township, New Jersey

PREPARED FOR:

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1.0 INTRODUCTION

Environmental Resolutions, Inc. (ERI) has prepared this report to document the findings of a Preliminary Environmental Investigation at the proposed Aerohaven Park in Evesham Township, Burlington County, New Jersey (the Site). The proposed park includes athletic fields, nature trails, and picnic areas. The investigation was initiated at the request of Evesham Township to address environmental concerns expressed by residents near the proposed park.

Concerns were expressed regarding potential impacts on domestic wells due to the application of pesticides and fertilizers on the proposed athletic fields. The preliminary investigation of potential impacts on potable wells has included an evaluation of hydrogeologic conditions, an evaluation of the planned pesticide and fertilizers usage, a review of documentation of related studies conducted by the United States Geological Survey (USGS), an analysis of fate and transport, and an evaluation of domestic well receptors. The potential for the pesticides applied on the proposed athletic fields to leach through the soil into groundwater and cause contamination of the nearby domestic wells has been evaluated. Evaluations have also been conducted of the potential for the nitrogen fertilizers applied to the athletic fields to cause nitrate contamination of nearby domestic wells and of the potential for the fertilizer applications to increase radium levels in groundwater.

Concerns were also expressed regarding exposure to asbestos that was buried in a landfill adjacent to the Site. Potential impacts on the asbestos landfill due to the planned Site usage were evaluated by reviewing New Jersey Department of Environmental Protection (NJDEP) files.

2.0 PHYSICAL SETTING

The proposed Aerohaven Park includes several blocks and lots in Evesham Township. The Site is bounded to the west by Kettle Run Road, to the south by Haynes Creek, to the east by residential or wooded properties, and to the north by a residential development. The Site is depicted on the USGS Location Map in Appendix A.

2.1 Site Description

The portion of the Site, which is currently planned for development as a recreation facility is approximately 180 acres. A portion of the area of the proposed development is currently wooded and the southern area is part of the former Burlington-Camden County Airport. Abandoned cranberry bogs and two recharge basins are located near the northern edge of the proposed development. The proposed Site Plan, included in Appendix B, is based on a plan prepared by T & M Associates.

2.2 Surface Waters

Haynes Creek, located at the south end of the Site, flows northeast and eventually joins the Southwest Branch of the Rancocas Creek. Black Run flows north through the west edge of the Site and joins Barton Run to the north.

2.3 Regional Hydrogeologic Setting

The southern half of the Site is located within a mapped outcrop of the Cohansey Formation as shown on the Geologic Map included in Appendix B. The Cohansey Formation (middle Miocene, serravallian) is composed of sand, white to yellow with local gravel and clay. Locally stained red or orange brown by iron oxides and (or) cemented into large blocks of ironstone. Unweathered clay is typically dark gray, but commonly weathers white where interbedded with thin beds of ironstone. The unit is a complex of interfingering marine and nonmarine facies. Sand is typically medium grained and moderately sorted although it ranges from fine to very coarse-grained and from poorly to well sorted. Sand consists of quartz and siliceous rock fragments. Some beds are locally micaceous, and in the Lakehurst area of Ocean County, some beds have high concentrations of "black" sand (pseudorutile) that was once extensively mined. In general, the sand is cross-bedded, although the style of cross bedding varies significantly with the paleoenvironment. Trough cross bedding predominates; especially in the nonmarine channel fill deposits, and the scale of the cross beds varies from small to large. In some areas, planar bedding is well developed in sections that have abundant marine burrows (mostly the clay-lined trace fossil Ophiomorpha nodosa). Such marine-influenced beds (largely foreshore deposits) occur on the central sheet west of Asbury Park, near Adelphia, Monmouth County, north of the Lakehurst Naval Air Station, Ocean County, and at Juliustown, Burlington County (Owens and Sohl, 1969), and in southern New Jersey as far north as Salem, Salem County. Gravel beds occur locally especially in updip areas such as near New Egypt, Ocean County, in the Atlantic Highlands and in the highlands west of Barnegat, Ocean County and in mixed marine and nonmarine facies in the northeastern part of southern New Jersey where gravel

occurs in well-defined channels. Most of the gravel is 1.3 to 2.5 cm (0.5-1.0 in) in diameter, but pieces as long as 10 cm (4 in) are present. The gravel is composed of quartz with small amounts of black chert and quartzite. Clay commonly occurs as discrete, thin, discontinuous beds, is dark gray where unweathered, white, or red where weathered. Lesser, thin laminated clay strata also are present. Locally, as near Lakehurst, thick, dark-gray, very lignitic clay was uncovered during the mining of ilmenite and is informally called the Legler lignite (Rachele, 1976). An extensive, well-preserved leaf flora was collected from a thick clay lens in a pit near Millville, Cumberland County. The leaf flora was dominated by *Alangium* sp., a tree no longer growing in eastern North America (J. A. Wolfe, written commun., 1992).

Maximum thickness is about 60 m (197 ft); however, thickness is difficult to determine because of the irregular basal contact and extensive post-depositional erosion. There is as much as 18 m (59 ft) of relief along the basal contact. The basal contact is sharp, undulatory, and directly overlain by a thin gravel bed. The Cohansey Formation unconformably overlies the Kirkwood Formation and found in channels cut down into the Kirkwood. Where the Kirkwood consists of sandy, light-colored sediments, the basal contact of the Cohansey is drawn below cross-bedded sediments. Where the Kirkwood consists of dark-colored silty beds, the basal contact is drawn between light-colored Cohansey sediments and the underlying dark-colored sediments. The Cohansey was markedly thinned because of erosion prior to deposition of overlying units in the western and southern parts of the southern New Jersey (Owens and Minard, 1975). The unit has been extensively eroded and stripped from large areas of the New Jersey Coastal Plain, particularly in central New Jersey where outliners are common. In spite of its widespread nature, the Cohansey is poorly exposed because of its loose sandy composition, which causes it to erode easily (Newell and others, in press). Because of this same sandy nature, the Cohansey has been widely mined for sand, and manmade exposures are common in many areas.

The age of the Cohansey is controversial because no calcareous microfauna or macrofauna have been found in this formation. The best indication of age comes from pollen and spores obtained from dark carbonaceous clay. Rachele (1976) analyzed the microflora from the Legler site and noted that the Cohansey had a rich and varied assemblage including several genera labeled "exotics" which no longer occur in the northeastern United State; Engelhardia, Pterocarya, Podocarpus, and Cyathea. Greller and Rachele (1984) estimated a middle Miocene age. Ager's (in Owens and others, 1988) analysis of the Cohansey from the ACGS-4 corehole near Mays Landing also suggests a middle Miocene (Serravallian) age.

The northern portion of the Site is located in a mapped outcrop of the Lower Member of the Kirkwood Formation. The Lower member (lower Miocene, Burdigalian and Aquitanian) is composed of sand and clay. Upper sand facies: sand, typically fine- to medium-grained, massive to thick-bedded, locally crossbedded, light yellow to white, locally very micaceous and extensively stained by iron oxides in near-surface beds. The thick-bedded strata commonly consist of interbedded fine-grained, micaceous sand and gravelly, coarse-to fine-grained sand. Some beds are intensely burrowed. Trough crossbedded strata with high concentrations of ilmenite and a few burrows are most commonly seen in the Lakewood quadrangle. Lower clay facies: clay and clay-silt, massive to thin-bedded, dark-gray, micaceous, contains wood

fragments, flattened lignitized twigs, and other plant debris. Locally, the clay has irregularly shaped sand pockets, which may represent some type of burrow. In the least weathered beds, the sand of the upper sand facies is principally quartz and muscovite with lesser amounts of feldspar. The light-mineral fraction of the dark-colored clay has significantly more feldspar (10-15 percent) and rock fragments (10-15 percent) than the upper sand facies, where the feldspar was probably leached during weathering. The basal beds have a reworked zone 0.3 to 1.2 m (1-4 ft) thick that contains fine- to very coarse-grained sand and, locally, gravel. These beds are very glauconitic and less commonly contain wood fragments. Reworked zones are present throughout the lower member. The lower member consists of a lower fine-grained, clayey, dark-colored, micaceous sand (transgressive) and an upper massive or thick-bedded to crossbedded, light-colored sand (regressive). The lower, dark clayey unit was formerly called the Asbury Park Member. The clay-silt was previously called the Asbury Clay by Kummel and Knapp (1904).

The upper sand facies has been observed only in pits and road cuts. It is poorly exposed because of its sandy nature. In central New Jersey, the lower clay facies is exposed in pits north of Farmingdale, Monmouth County; in a few cuts along the Manasquan River, north of Farmingdale; and along the Shark River, northeast of Farmingdale. In southern New Jersey, the lower clay facies is exposed only where the Coastal Plain was deeply entrenched and stripped away. In the southwestern most part of southern New Jersey, for example, the Cohansey Formation and much of the upper sand facies were stripped away by successive entrenchments of the Delaware River.

The combined Cohansey and Kirkwood Formations form the unconfined Kirkwood-Cohansey Aquifer System. The Kirkwood-Cohansey aquifer is tapped for domestic purposes near the Site through shallow wells.

2.4 Local Hydrogeologic Setting

The local hydrogeologic setting was evaluated by reviewing drillers logs for nearby domestic wells, by reviewing reports prepared for the asbestos landfill, and by reviewing a hydrogeologic report that was prepared for the Camden County Municipal Utilities Authority. The domestic well logs indicate that the area is generally underlain by approximately fifty feet of sand of the Kirkwood and Cohansey Formations. A stratum of clay is encountered below the sand to depths of approximately 260 feet. The thickness of the clay is approximately 200 feet below the Site. This clay is part of the Hornerstown and Navesink Marl Formations and serves as a confining layer to the underlying sands of the Mount Laurel Formation.

Four groundwater-monitoring wells were installed adjacent to the asbestos landfill. It was reported that the depth to groundwater ranged from 8 to 31 feet below the surface and that seasonal water levels fluctuated up to five feet. The hydraulic gradient across the site was reported to be approximately 0.01 ft/ft with groundwater flow directed towards Haynes Creek to the southeast of the landfill.

The Camden County Municipal Utilities Authority report summarizes the findings of several aquifer tests completed for water supply wells completed in the Kirkwood and Cohansey

Formations near the Site. The average hydraulic conductivity for these tests was approximately 100 ft/day.

2.5 Soil Survey

Several soil types are located on the Site as shown on the Soils Map included in Appendix B. Soil types present at the Site are controlled primarily by the underlying geologic source material, age of soil, and degree of drainage. Soils developed from the Kirkwood and Cohansey Sands are generally well drained to excessively drained, are loamy and sandy, are relatively infertile, have low pH (less than 3.6-4.4), and are susceptible to leaching. The following table summarizes soil types and selected engineering characteristics as indicated in the Soil Survey of Burlington County.

Soils & Map Symbols	Depth to Seasonal High Water Table (feet)	Dominant USDA Texture	Permeability (inches per hour)	Drainage	Pesticide Loss Potential from Leaching
Alluvial land, sandy: Ap	0	Sand	>6.3	Subject to stream overflow	Severe
Atsion sand: At	1	Sand or loamy sand	2.0-6.3+	Moderately rapid permeability, suitable for drainage if water table is controlled	Severe
Atsion fine sand: Av	1	Fine sand or loamy fine sand. Fine sand or sand.	2.0-6.3 >6.3	Moderately rapid permeability, suitable for drainage if water table is controlled	Severe
Evesboro sand: EvB	>5	Fine sand or sand	2.0-6.3+	Excessively drained	Severe
Lakehurst sand: LaA	1-3	Sand or fine sand	>6.3	Moderately well or somewhat poorly drained	Severe
Lakehurst fine sand: LnA	1-3	Sand or fine sand	>6.3	Not applicable or not needed	Severe
Lakewood sand: LtB, LtD	>5	Sand or fine sand	>6.3	Excessively drained	Severe
Lakewood fine sand: LwB	>5	Sand or fine sand	>6.3	Excessively drained	Severe
Made land, sanitary fill: Mg				Not available	Variable
Urban land, sandy: Ug	>5	Loamy sand or sandy loam	2.0-6.3	Not available	Severe

As shown on the table, soils at the Site are primarily sands or fine sands. Finer grained soils are encountered near streams and areas of alluvial deposition. The Natural Resource Conservation Service (NRCS) of Burlington County was contacted regarding the susceptibility to leaching of soils at the Site. The soil pesticide loss potentials listed in the above table were provided. As noted in the table, all soil types found at the Site have a severe pesticide leaching potential due to coarse-grained soils.

3.0 PROPOSED APPLICATION OF PESTICIDES AND FERTILIZER

As part of the proposed Aerohaven Park, approximately forty acres of athletic fields will be constructed at the Site. It is planned that turf grass of a residential variety will be installed on a four thick topsoil layer on the athletic fields that are proposed for the Site. As part of a typical turf grass management program, a selection of pesticides and fertilizers will be applied and the field will be irrigated. The approximate application area is included on the Site Plan included in Appendix B.

Trugreen*Chemlawn is currently being contracted by Evesham Township to apply pesticides and fertilizers on existing athletic fields in other areas of the Township. Trugreen has provided ERI with information regarding the specific types of commercial pesticides and fertilizers that are currently being used with application rates. Material Safety Data Sheets (MSDS) for the products were also provided and copies are included in Appendix E. It is assumed that applications on the proposed fields will be similar to those of existing Evesham Township fields.

Pesticide applications will be limited to an annual application of an insecticide to control grubs, an annual application of a herbicide to control crab grass, and an annual application of herbicides for weeds. To control grubs, Merit 75 WP will be applied to turf grass areas once per year. To control crab grass, PRE-M 3.3 EC Herbicide will be applied to turf grass areas once per year. To control weeds, Riverdale Trupower Selective Herbicide will be applied to turf grass areas once per year.

Natural groundwater recharge for the area of the Site is approximately 18 inches per year. During the growing season, the turf grass will be irrigated at a rate of approximately 1 inch per week.

A summary of the anticipated usage and characteristics are summarized below. The characteristics were obtained from the following sources:

EXTOXNET – Extension Toxicology Network, http://ace.orst.edu
Manufacturers Material Data Safety Sheets (Appendix E)
IRIS – United States Environmental Protection Agency – Integrated Risk Information System, htpp://www.epa.gov/iris.htm

3.1 Merit 75 WP

To control grubs, Merit 75 WP will be applied to turf grass areas once per year. The application rate will be 0.3 pounds of Merit 75 WP mixed with 88 gallons of water applied to one acre of turf grass area. The active ingredient in Merit 75 WP is imidacloprid (75%). Imidacloprid will be applied at a concentration of approximately 300 parts per million (ppm). However, the concentration that enters into the soil will be diluted by irrigation. An initial concentration for the pesticide entering the soil has been estimated at 1.0 ppm based on dilution from irrigation at a rate of 1 inch per week.

3.1.1 Physical Properties

Imidacloprid is a colorless crystal with a weak characteristic odor. Solubility of imidacloprid in water is 510 mg/l at 20 degrees C.

3.1.2 Environmental Fate

The half-life of imidacloprid in soil is 48-190 days, depending on amount of groundcover (it breaks down faster in soils with plant ground cover). Organic material aging may also affect the breakdown rate. Imidacloprid is degraded to the primary metabolite 6-chloronicotinic acid, which eventually breaks down into carbon dioxide. There is generally not a high risk of groundwater contamination if used as directed. Solubility is moderate, and imidacloprid has moderate binding affinity to organic materials in soils. There is a potential for the compound to move through sensitive soil types including porous, gravelly, or cobbly soils, depending on irrigation practices.

3.1.3 Toxicity

In its pure chemical form, imidacloprid is moderately toxic. The chemical is considered to be of minimal carcinogenic risk, and is categorized by EPA as a "Group E" carcinogen (evidence of noncarcinogenicity for humans). A groundwater maximum contamination level (MCL) has not been established for chronic exposure to low concentrations. Imidacloprid is quickly and almost completely absorbed from the gastrointestinal tract in humans and animals, and is eliminated via urine and feces. The most important metabolic steps include the degradation to 6-chloronicotinic acid, a compound that acts on the nervous system. Signs and symptoms due to 6-chloronicotinic would be expected to be fatigue, twitching, cramps, and muscle weakness including the muscles necessary for breathing.

3.2 PRE-M 3.3 EC Herbicide

To control crab grass control, PRE-M 3.3 EC Herbicide will be applied to turf grass areas once per year. The application rate will be 3 pints of PRE-M mixed with 88 gallons of water applied to one acre of turf grass area. The active ingredients in PRE-M is pendimethalin (37.4%). Pendimethalin will be applied at a concentration of approximately 5000 ppm. An initial concentration for the pesticide entering the soil has been estimated at 15.5 ppm based on dilution from irrigation at a rate of 1 inch per week.

3.2.1 Physical Properties

Pendimethalin is an orange-yellow crystalline solid and has a nutty or fruit-like odor. Solubility of pendimethalin in water is 0.3 mg/l at 20 degrees C.

3.2.2 Environmental Fate

The half-life of pendimethalin in soil is approximately 40 days. It does not undergo rapid microbial degradation except under anaerobic conditions. Slight losses of pendimethalin can result from photodecomposition and volatilization. Pendimethalin is strongly absorbed by most soils. Increased organic material and clay is associated with increased soil binding. It is practically insoluble in water, and thus will not leach appreciably in most soils, and should present a minimal risk of groundwater contamination.

3.2.3 Toxicity

In its pure chemical form, pendimethalin is moderately toxic. Pendimethalin is moderately toxic. It is largely unabsorbed from the gastrointestinal tract, and excreted unchanged in the feces. Pendimethalin, which does become absorbed into the bloodstream from the gastrointestinal tract, is rapidly metabolized in the kidneys and liver and then is excreted as metabolites via urine. Evidence suggests that pendimethalin is not carcinogenic. A groundwater MCL has not been established for chronic exposure to low concentrations.

3.3 Riverdale Trupower Selective Herbicide

To control weeds, Riverdale Trupower Selective Herbicide will be applied to turf grass areas once per year. The application rate will be 3 pints of Trupower mixed with 88 gallons of water applied to one acre of turf grass area. The active ingredients in Trupower are dicamba (4.73%), MCPA (48.13%), and clopyralid (5.18%).

The application concentration of dicamba will be approximately 350 ppm, the application concentration of MCPA will be approximately 3600 ppm, and the application rate of clopyralid will be approximately 380 ppm. Based on dilution from irrigation at a rate of 1 inch per week, initial concentrations for the pesticides entering the soil has been estimated at 1.14 ppm for dicamba, 11.57 ppm for MCPA, and 1.25 for clopyralid.

3.3.1 Physical Properties

Dicamba is an odorless, white crystalline solid with solubility in water of 6,500 mg/l at 20 degrees C. MCPA is a colorless crystal with solubility in water of 825 mg/l at 20 degrees C. Clopyralid's solubility in water is 1,000 mg/l at 20 degrees C.

3.3.2 Environmental Fate

The half-life of dicamba in soil is 1-4 weeks. Metabolism by soil microorganisms is the major pathway of loss under most soil conditions. The rate of biodegradation increases with temperature and increasing soil moisture, and tends to be faster when the soil is slightly acidic. When soil moisture increases above 50%, the rate of biodegradation declines. Dicamba slowly breaks down in sunlight and volatilization is probably not significant. Dicamba does not bind to soil particles and is highly soluble in water. It is therefore highly mobile and may contaminate groundwater.

MCPA and its formulations are rapidly degraded by soil microorganisms and it has a low persistence, with a reported field half-life of MCPA in soil of 14 days to 1 month, depending on soil moisture and soil organic matter. Decreased soil moisture and microbial activity, as well as increased soil organic matter, will prolong the field half-life. With less than 10% organic matter in the soil, the compound is degraded in 1 day and, with greater than 10% levels in soil; it takes 3 to 9 days to degrade. The half-life is 5 to 6 days in slightly acidic to slightly alkaline soils. MCPA readily leaches in most soils, but its mobility decreases with increasing organic matter. MCPA and its formulations show little affinity for soil.

Limited information was available for clopyralid. The reviewed information indicates that clopyralid has soil persistence similar to dicamba and has low volatility. The MSDS sheet for Trupower indicates that clopyralid may leach through soil into groundwater under certain conditions of use. It also states that use of the product in areas were soil is permeable, and where the water table is shallow, may result in leaching to groundwater.

3.3.3 Toxicity

In pure chemical form, dicamba is slightly toxic by ingestion and slightly toxic by inhalation or dermal exposure. Evidence indicates that dicamba is not carcinogenic. Dicamba is quickly absorbed into the bloodstream from the gastrointestinal tract and is mostly excreted in urine. Evidence has shown that dicamba does not bioaccumulate in mammalian tissues. A groundwater MCL has not been established for chronic exposure to low concentrations.

In pure chemical form, MCPA is slightly toxic by ingestion and slightly toxic by dermal exposure. Evidence indicates that MCPA is not carcinogenic. MCPA is quickly absorbed and excreted in the urine. Evidence has shown that MCPA does not bioaccumulate in mammalian tissues. The major metabolite of MCPA is 2-methyl-4-chlorophenol in the free and conjugate form, which is formed in the liver. A groundwater MCL has not been established for chronic exposure to low concentrations.

Toxicological information was not available for clopyralid. A groundwater MCL has not been established for chronic exposure to low concentrations.

3.4 TurFlo Fertilizer

The proposed fertilizer is TurFlo Fertilizer 17-2-5, which consists of 17 parts nitrogen, 2 parts phosphorus, and 5 parts potassium. Fertilizer will be applied four times per year at a rate of one pound per 1,000 square feet of application area. This application rate is typical for residential lawns.

4.0 USGS INVESTIGATIONS

Investigations on the occurrence of pesticides, nitrogen, and radium in the Kirkwood Cohansey Aquifer System were reviewed to assess the potential for the proposed Site use to impact groundwater below the Site. Four United States Geologic Survey (USGS) reports selected for review are summarized below.

4.1 Occurrence of Pesticides and Nitrates in the Kirkwood Cohansey Aquifer System

In 1997, the USGS prepared Water-Resources Investigations Report 97-4241, *Occurrence of Nitrate, Pesticides, and Volatile Organic Compounds in the Kirkwood-Cohansey Aquifer System, Southern New Jersey*. As part of the investigation, the USGS collected samples from a network of 72 shallow monitoring wells for analysis. The samples were collected from the Kirkwood-Cohansey Aquifer system in the Gloucester County area. The investigation was initiated due to the increased reliance on groundwater from the Kirkwood-Cohansey as an alternate to the Potomac-Raritan-Magothy aquifer system. As a surficial unconsolidated aquifer system, the Kirkwood Cohansey was identified as being susceptible to contamination. A review of this study was conducted since the geologic setting is similar to the Site.

The results of the USGS investigation indicate that nitrate was the most frequently detected nutrient in recently recharge groundwater. Natural sources of nitrogen, such as precipitation and plant residues, generally contribute low concentrations of nitrate to groundwater. Inputs from human sources, such as domestic and agricultural fertilizers and effluent from leaking sewer lines, cesspools, and septic tanks, can increase nitrate concentrations significantly in recently recharged groundwater beneath agricultural and urban areas.

The median concentration of nitrate was highest in samples from agricultural areas, where nitrogen fertilizers are used for crop production. Nitrate in 60% of the samples from agricultural areas exceeded the United States Environmental Protection Agency (EPA) MCL of 10mg/L. Median nitrate levels from old and new urban areas were 3.5 and 2.6 mg/L. Nitrate concentrations were lowest in undeveloped areas, reflecting the lack of human inputs of nitrogen into the subsurface environment in these areas.

The most frequently detected pesticides during the USGS investigation included atrazine, desethylatrazine (atrazine-degradation byproduct), simazine, metachlor, prometon, and dieldrin. Pesticides were detected in both urban and agricultural land use areas. The pesticide pendimethalin, a proposed pesticide for the Site, was detected in 4.2% of the samples. The maximum detected concentration was 0.0279 ug/l. A MCL has not been established for this pesticide. None of the other pesticides that will be applied at the Site were detected in the groundwater samples collected during this study.

4.2 Affects of Aquifer Depth and Land Use on Distribution of Radium, Nitrate, and Pesticides

In 1997, the USGS prepared Water-Resources Investigations Report 96-4165A, *Relation of Distribution of Radium, Nitrate, and Pesticides to Agricultural Land Use and Depth, Kirkwood-Cohansey Aquifer System, New Jersey Coastal Plain, 1990-91*. As part of the investigation, the USGS examined the relationship of the distributions of dissolved radium, nitrate, and pesticides in the aquifer to the distribution of agricultural land and to depth in agricultural areas in the Coastal Plain of southern New Jersey. The USGS collected water samples from 42 wells screened in the Kirkwood-Cohansey aquifer system in agricultural and non-agricultural areas and collected samples from 15 nested observation wells and two piezometers at five sites in agricultural areas. A review of this study was conducted since the geologic setting is similar to the Site.

The results of radium analysis on samples from 42 wells completed in the Kirkwood-Cohansey aquifer indicate that concentrations of both dissolved radium-226 and dissolved radium-228 were significantly higher in agricultural areas than in non-agricultural areas. The sum of the concentrations of radium-226 and radium-228 did not exceed the primary drinking water standard of 5 pCi/L in the non-agricultural groundwater samples. The primary drinking-water standard was exceeded in 39% of the samples obtained from agricultural areas.

Concentrations of nitrate and other inorganic chemicals were significantly greater in water samples from agricultural areas than in samples from non-agricultural areas. Statistical analysis indicates that concentrations of both dissolved radium radionuclides are significantly correlated with the concentrations of nitrate, which is associated with agricultural land use.

Water samples were collected from a network of nested observation wells placed in an area of assumed vertical groundwater flow in agricultural and non-agricultural areas. The wells were screened at depths of five feet, twenty to forty-five feet, and sixty to ninety feet below grade. Samples were obtained from these wells to assess the vertical extent of groundwater impacts as a worst-case scenario. The concentrations of radium-226, radium-228, nitrate, and other inorganic chemicals were significantly greater at five to forty-five foot depths than at greater depths. The vertical distributions of radium and inorganic constituents associated with agricultural activity, such as nitrate from fertilizer, are moderately to strongly correlated. The results indicate that radium is more mobile in shallow groundwater, where concentrations of agricultural chemicals are elevated, than in deep groundwater, where concentration of agricultural chemicals are low.

It was stated that the naturally acidic groundwater was the primary cause of radium detection in groundwater throughout the Kirkwood-Cohansey aquifer system. The acidity is the cause of the low storage capacity of the aquifer matrix for radium (less radium binds to the aquifer soil matrix), which causes relatively more radium to be dissolved by the groundwater. It was concluded that though the shallow groundwater and agricultural areas was no more acidic than non-agricultural areas, fertilization and liming of the soil increases the ionic strength of the groundwater solution. This increased ionic load in agricultural areas changes the sorbent surface

of the aquifer matrix and increases the relative mobility and concentrations of radium in groundwater. In summary, it was concluded that radium concentrations increase in shallow groundwater beneath agricultural areas because the radium is less likely to bind to the soil in the aquifer matrix due to the presence of higher levels of competing ions due to heavy applications of nitrogen fertilizer and lime.

4.3 Sources and Distribution of Nitrate in Water from Shallow Domestic Wells

In 1993, the USGS prepared Water-Resources Investigations Report 93-4178, *Indicators of the Sources and Distribution of Nitrate in Water from Shallow Domestic Wells in Agricultural Areas of the New Jersey Coastal Plain.* As part of the investigation, the USGS examined the relationship between the distribution of nitrate in groundwater and agricultural land use and geology. The USGS analyzed groundwater samples collected between 1980-89 from 230 shallow wells in the outcrop of the Kirkwood-Cohansey and Potomac-Raritan-Magothy aquifer systems. Sample results were used to compare the relationship between regional land use and shallow groundwater quality. A review of this study was conducted since the geologic setting is similar to the Site and nitrate has been identified as a concern.

The results of the analysis of groundwater samples indicated that nitrate was detected above the EPA MCL of 10 ug/L in 33 percent of the 60 shallow wells in agricultural areas. Nitrate levels increased in groundwater samples as the percentage of agricultural use within 800 meters of the well increased. Irrigation and domestic wells in agricultural areas contained similar levels of nitrate indicating that most of the nitrate in the groundwater resulted from agricultural practices rather than other sources, such as septic systems.

Groundwater samples collected from 12 shallow domestic wells in agricultural areas screened in the outcrop areas of the Kirkwood-Cohansey and Potomac-Raritan-Magothy aquifer systems were used to evaluate the local effects of hydrogeologic conditions and land use activities on shallow groundwater quality. Nitrate exceeded the MCL in 50% of the wells. Concentrations of nitrate greater than the MCL are associated with: specific conductance greater than 200 microsiemens per centimeter at 25 degrees Celsius, a screened interval whose top is less than 60 feet below the land surface, concentrations of dissolved oxygen greater than 6 milligrams per liter, presence of pesticides in the groundwater, a distance of less than 250 meters between the wellhead and the surface water divide, and presence of livestock near the wellhead. Ratios of stable isotopes of nitrogen in the water samples indicate that the source of nitrate in the groundwater was predominantly chemical fertilizers rather than livestock wastes or effluent from septic systems.

4.4 Fate and Transport of Radium and Nitrate in Current and Former Agricultural Areas

In 1997, the USGS prepared Water-Resources Investigations Report 96-4165B, *Relation of Groundwater Flowpaths and Travel Time to the Distribution of Radium and Nitrate in Current and Former Agricultural Areas of the Kirkwood-Cohansey Aquifer System, New Jersey Coastal Plain.* As part of the investigation, the USGS examined the effects of groundwater flow

systems on the distribution of nitrate and radium in groundwater below former and current agricultural lands. The USGS analyzed groundwater samples collected from nests of three wells at five different sites in the Kirkwood-Cohansey Aquifer System. A review of this study was conducted since nitrate and radium are a concern at the Site and since the investigation was conducted in the Kirkwood-Cohansey aquifer system.

The nested wells were installed in an area of surface water drainage divide between the Delaware River and the Atlantic Ocean. This area was selected to provide the greatest vertical groundwater flow direction. The results of groundwater samples collected from the nested monitoring wells indicated a moderate-to-high correspondence between concentrations of radium and nitrate. Radium concentrations were substantially higher in the shallow and medium depth wells than in the deep wells. Since the intensive use of agricultural chemicals probably began in 1940, groundwater with an age greater than fifty years contained lower concentrations of nitrate. The depth of groundwater with a fifty-year travel time is greater than eighty feet. Therefore, groundwater deeper than eighty feet generally contained lower concentrations of nitrate, which resulted in lower concentrations of radium. The conceptual models developed during the investigations could also predict areas that do not contain elevated concentrations of radium and nitrate. These aquifer areas would be located deep beneath agricultural areas or adjacent nonagricultural areas where groundwater was recharged through an agricultural area but has a travel time greater than 50 years, and beneath nonagricultural areas where shallow groundwater was not recharged through an adjacent agricultural area.

This investigation was conducted in an area where vertical groundwater flow would be high. Groundwater flow at the Site would be expected to have a greater horizontal flow direction than a vertical flow direction. Therefore, the depth of the fifty-year travel time would be expected to be less than the depth predicted in the USGS investigation.

5.0 SITE SPECIFIC FATE AND TRANSPORT

5.1 Pesticides

Applications of pesticides have historically been an environmental concern. Before the 1940s, most pesticides contained heavy metals such as arsenic, mercury, copper, or lead. These pesticides were not readily soluble and rarely leached into groundwater. A group of chlorinated organic pesticides was introduced during World War II that included DDT, chlordane, heptachlor, and toxaphene. These pesticides had low solubility and tended to attach to soil particles. After it was discovered that these pesticides were carcinogenic and could accumulate in the environment at toxic concentrations, most of their uses were restricted, suspended, or canceled.

Phosphorus-based compounds such as malathion and diazinon were introduced to replace the chlorinated pesticides. These pesticides generally breakdown rapidly in the environment and rarely leach to groundwater. For example, the half-life of malathion is 1 day as compared to a half-life of 2000 days for DDT. Another group of organic pesticides, Carbmates such as aldicarb and carbofuran, also have replaced the chlorinated pesticides. These non-carcinogenic pesticides tend to be soluble in water and may reach groundwater if not absorbed by plants or degraded in the soil.

At the present time, very few pesticides currently regulated by the United States Environmental Protection Agency (EPA) are known to cause cancer in drinking water. Few MCLs for drinking water, which are based on long-term exposure to low levels of toxics, have been established for phosphorus and carbamate pesticides. Although toxic to humans in their original chemical form, these pesticides are rarely detected in groundwater and adverse effects due to long-term exposure at low concentrations are uncommon.

An evaluation of the environmental fate and transport of the pesticides that are likely to be applied at the site has been performed. This evaluation combined analyses of pesticide degradation and solute transport rates.

5.1.1 Degradation Analysis

A degradation analysis has been performed for the pesticides that will be used at the Site. When groundwater or soil are contaminated, the time for contaminant concentrations to degrade to applicable MCL is often estimated by using the following relationship:

$$C=C_o e^{-(0.693tT1/2)}$$

Where,

t = time (yr)
C = concentration at the time t (MCL)
C_o = initial concentration
$T_{1/2}$ = half-life (yr)

Since no MCLs have been established for the pesticides that will be used at the Site, the time for concentrations to degrade to 1 ppm and to 0.001 ppm (1 ppb) have been estimated. These concentrations were selected because 1 ppm is a conservative MCL for non-carcinogen contaminants and 1 ppb is typical laboratory detection limit for organic compounds. The following table summarizes the estimates of degradation times for each of the pesticides based on the estimates of the initial concentrations entering the soil. The effects of plant uptake and dilution due to recharge are neglected in this analysis.

Compound	C (ppm)	C_o (ppm)	$T_{1/2}$ (da)	t (yr)	t (da)
Imidacloprid	1	1	190	0	0
	0.001	1	190	5.18	1891
Pendimethalin	1	15.5	40	0.43	157
	0.001	15.5	40	1.52	555
Dicamba	1	1.14	28	0.01	4
	0.001	1.14	28	0.78	285
MCPA	1	11.57	30	0.29	106
	0.001	11.57	30	1.11	405
Clopyralid	1	1.25	40	0.03	11
	0.001	1.25	40	1.13	412

5.1.2 Transport

Based on the above degradation times a groundwater travel time analysis has been performed for the pesticides. The analysis was conservative with several assumptions that would tend to exaggerate the distance pesticides could travel from the point of application. The analysis was based on advective and retarded transport of the dissolved pesticides in groundwater with estimates of vertical transport through the unsaturated soil.

Advection (horizontal flow) is the dominant factor for soluble migration in groundwater. Simple advective analytical models rely upon Darcy's Law, which can be stated as:

$$V_s = KI/n_e$$

Where,

V_s = groundwater seepage velocity
K = hydraulic conductivity
I = groundwater gradient
n_e = effective porosity

Based on the results of aquifer testing in the vicinity of the Site, the hydraulic conductivity (K) can be estimated at 100 ft/day. Using a groundwater gradient 0.01 ft/ft based on

the asbestos landfill groundwater monitoring, and a coarse sand effective porosity of 0.35, the seepage velocity can be estimated at approximately 1000 ft/yr.

The rate of the advective transport of dissolved organic compounds in groundwater is retarded due to the absorption of chemicals onto the soil and thus is slower than the groundwater seepage velocity. The retarded velocity of the pesticides was derived by calculating a retardation factor (Rd) based on the following equation:

$$Rd = 1 + (BKd)/n_e$$

Where;

B = soil bulk density
Kd = distribution coefficient = Koc x Foc
Koc = compound affinity to organic carbon
Foc = fraction of organic carbon in the aquifer

Retardation factors (Rd) have been calculated by using 0.35 for n_e, 1.6 g/cm^3 for B (typical value), 0.001 for Foc (a conservatively low estimate), and published values for Koc. Rd has been multiplied by the estimate of groundwater seepage velocity to estimate the velocity in groundwater for the pesticides (V_p). The table provided summarizes the results of this analysis. A published Koc for imidacloprid has not been found, so this compound has been excluded from further analysis.

Compound	B (g/cm)	Foc	K_{oc}	R_d	V_p (ft/yr)
Pendimethalin	1.6	0.001	5000	23.87	42.9
Dicamba	1.6	0.001	2	1.009	991
MCPA	1.6	0.001	20	1.09	916
Clopyralid	1.6	0.001	6	1.027	973

Vertical contaminate transport in the soil column is slower than transport in groundwater because the soil is not saturated and the vertical hydraulic conductivity are generally are 10 to 100 times less than the horizontal hydraulic conductivity. To enable a conservative travel time analysis, unsaturated effects were ignored and it was assumed that the vertical hydraulic conductivity was ten times less the horizontal hydraulic conductivity. Therefore, it was assumed that the velocity through the soil column was 1/10 of the retarded groundwater velocity for each of the pesticides. For the purpose of the travel time analysis, it was also assumed that the depth to groundwater below the areas of application was ten feet.

The table provided below summarizes the results of the travel time analysis. Estimated distances that the pesticides may travel before degrading to 1 ppm ($D_{1\ ppm}$) and 1 ppb ($D_{1\ ppb}$) from the point of application are provided based on the previously summarized degradation rates, the estimates of the time for the pesticides to pass through the soil and leach into the groundwater

(T_{sgw}), and the retarded pesticide groundwater velocities (V_p). It was estimated that pendimethalin will degrade before leaching into groundwater, that dicamba will degrade to 1 ppm within 14 feet down gradient from the point of application and will degrade to 1 ppb within 672 feet down gradient from the point of application, that MCPA will degrade to 1 ppm within 226 feet down gradient from the point of application and will degrade to 1 ppb within 917 feet down gradient from the point of application, and that dicamba will degrade to 1 ppm within 34 feet down gradient from the point of application and will degrade to 1 ppb within 997 feet down gradient from the point of application,

Compound	T_{sgw} (yr)	T_{sgw} (da)	$D_{l\ ppm}$ (ft)	$D_{l\ ppb}$ (ft)
Pendimethalin	2.4	5000	0	0
Dicamba	0.1	2	14t	672
MCPA	0.1	20	226	917
Clopyralid	0.1	6	34	997

The above travel time analysis should be considered conservative especially for the herbicides dicamba, MCPA, and clopyralid. Most of the applied herbicides will be reduced by plant uptake. No detections were reported in the reviewed USGS studies for these herbicides in groundwater monitoring wells located within application areas. Due to the rapid degradation rates and the plant uptake, it is unlikely that measurable quantities of these herbicides will actually leach to groundwater at the Site.

5.2 Fertilizers

Based on the findings reported by the USGS and the application rates that will be used at the Site, there appears to be minimal potential for the fertilizers to adversely impact groundwater. The USGS has shown that nitrate levels can be increased by excessive applications of nitrogen fertilizers in agricultural areas. Nitrate has been detected in groundwater in agricultural use areas at concentrations greater than the 10 ppm MCL in studies completed by the USGS and the NJDEP. However, the studies have shown that for residential areas nitrate levels do not exceed the MCLs due to residential fertilizer applications.

The proposed fertilizer is TurFlo Fertilizer 17-2-5, which consists of 17 parts nitrogen, 2 parts phosphorus, and 5 parts potassium. This low phosphorus fertilizer will be applied four (4) times per year at a rate of one pound per 1,000 feet. This application rate is less than that typically applied for residential lawn care and is much less than that applied on golf courses and farms. Most of the nitrogen will be absorbed by the turf grass and the remainder should be reduced by denitrification before groundwater will be adversely impacted. Therefore, no adverse nitrate impacts to groundwater are likely due to the applications of fertilizer at the Site.

The findings reported by the USGS also indicated that detections of radium elevated above background levels in the Kirkwood-Cohansey aquifer system were found in shallow

groundwater in agricultural areas. It has been concluded that these elevated levels in agricultural areas are related to the heavy use of nitrogen fertilizers and lime. Elevated radium was not found in residential areas. Therefore, it can be inferred the residential type applications of fertilizers at the Site should also not cause elevated radium in the underlying groundwater.

Based on the minimal potential for groundwater to be adversely impacted by fertilizer applications at the Site, a quantitative fate and transport analysis has not been performed. Because the fertilizer that will be used at the site has a low phosphorus contact, adverse impacts to surface water due to runoff are also not likely.

6.0 RECEPTOR EVALUATION

To enable the assessment of potential receptors to the proposed applications of pesticides and fertilizers, a Receptor Evaluation was conducted. A search for well records in the area of the Site was conducted at the NJDEP Bureau of Water Allocation in Trenton, New Jersey. Approximately 120 wells were identified during the well search.

To locate the wells in relation to the Site, the Block and Lot of the reported well sites were used. The wells are shown in their approximate location on the Well Location Map included in Appendix C. The wells are generally concentrated in three areas. To the south of the Site, residences near Yorkshire Court and Deerfield Avenue have wells advanced to depths ranging from 52 feet to 350 feet. To the east of the Site, residences near Bortons Road have wells advanced to depths ranging from 282 feet to 315 feet. Wells at the Country Club Estates development located to the northeast of the Site have wells advanced to depths ranging from 265 feet to 385 feet. A door-to-door survey was not conducted as part of this initial investigation. Additional wells may be located near the Site, which were not identified as part of this investigation.

The proposed application of pesticides and fertilizers at the Site only has a potential to impact the shallow groundwater table. Wells completed to depths less than 100 feet would draw water from this shallow groundwater table. The shallow wells near the Site are limited to the residential area south of the Site.

The direction of groundwater flow in the Kirkwood-Cohansey aquifer generally follows the topographic gradient and the direction of the surface water drainage. The findings reported for the asbestos landfill indicated that the direction or groundwater flow to the immediate south of the Site was towards the southeast, which is in the direction of the topographic gradient and surface water drainage. A similar flow pattern is expected for the Site and the vicinity of Site.

Based on topographic gradient and the direction of surface water flow likely, directions of groundwater flow had been evaluated for the Site and vicinity. The Topographic Map presented in Appendix B depicts the expected groundwater flow directions. The map indicates that the expected groundwater flow direction in the southern portion of the Site is to the south-southeast towards Haynes Creek. The shallow domestic wells are located south of Haynes Creek and the topographic gradient in the area of these potential receptors is towards the north-northeast. Therefore, it is expected that the groundwater flow direction in the area of the shallow domestic wells is towards Haynes Creek to the north-northeast.

Based on the evaluation presented above, it appears that there are no shallow domestic wells located in the down-gradient direction of groundwater flow from the planned areas of pesticides and fertilizer applications. Furthermore, there are no shallow domestic wells located within potential travel time distances of the pesticides that are likely to be applied at the Site.

7.0 ASBESTOS LANDFILL

The Aerohaven property was previously owned by Owens-Corning Fiberglass. A utility airport was constructed at the Site between 1959 in 1961 and was in use from 1961 until 1981. Between 1961 and 1972, the owners of the property accepted municipal debris and insulation product containing asbestos fibers to fill low areas on the property. The source of the asbestos containing material was Owens-Corning's Berlin, New Jersey facility.

In 1995, under the oversight of the EPA and the NJDEP, Owens-Corning consolidated the fill material into a new landfill structure and capped the landfill pursuant to an approved Closure Plan. Documentation in the files reviewed at the NJDEP indicated that approximately 62,000 cubic yards of asbestos containing material, 103,258 cubic yards of borrow, and 4,676 cubic yards of debris were incorporated into the new landfill structure. The landfill cap included six inches of subgrade, a geocomposite clay cap, and 30 inches of compacted soil. The purpose of the cap was to reduce the surface water infiltration and to prevent exposure to the asbestos containing material. Construction was completed in September 1995. The surface of the landfill was seeded after construction to prevent erosion. A perimeter fence was installed in October 1995 to prevent public access to the landfill area.

The NJDEP and the EPA approved the landfill closure. The limits of the landfill are depicted on the Site Plan presented in the Appendix B. Owens Corning has maintained ownership of the landfill property. A Deed Notice was placed on this property as a condition of the NJDEP closure. The NJDEP also required periodic reporting on the condition of the fence and landfill cover. The latest report was included in a letter to the NJDEP dated July 31, 2000. It was reported that periodic inspections of the property were being made to guard against intrusion or adverse erosion events. It was stated that the cap was in good condition and that minor fence repairs had been completed.

It is apparent that the NJDEP does not consider the closed landfill to pose a threat to public health and safety. It also appears that the existing engineering controls are being properly maintained.

Asbestos only poses a threat if it is airborne and inhaled. It is non-soluble and does not pose a risk to groundwater.

8.0 CONCLUSIONS AND RECOMMENDATIONS

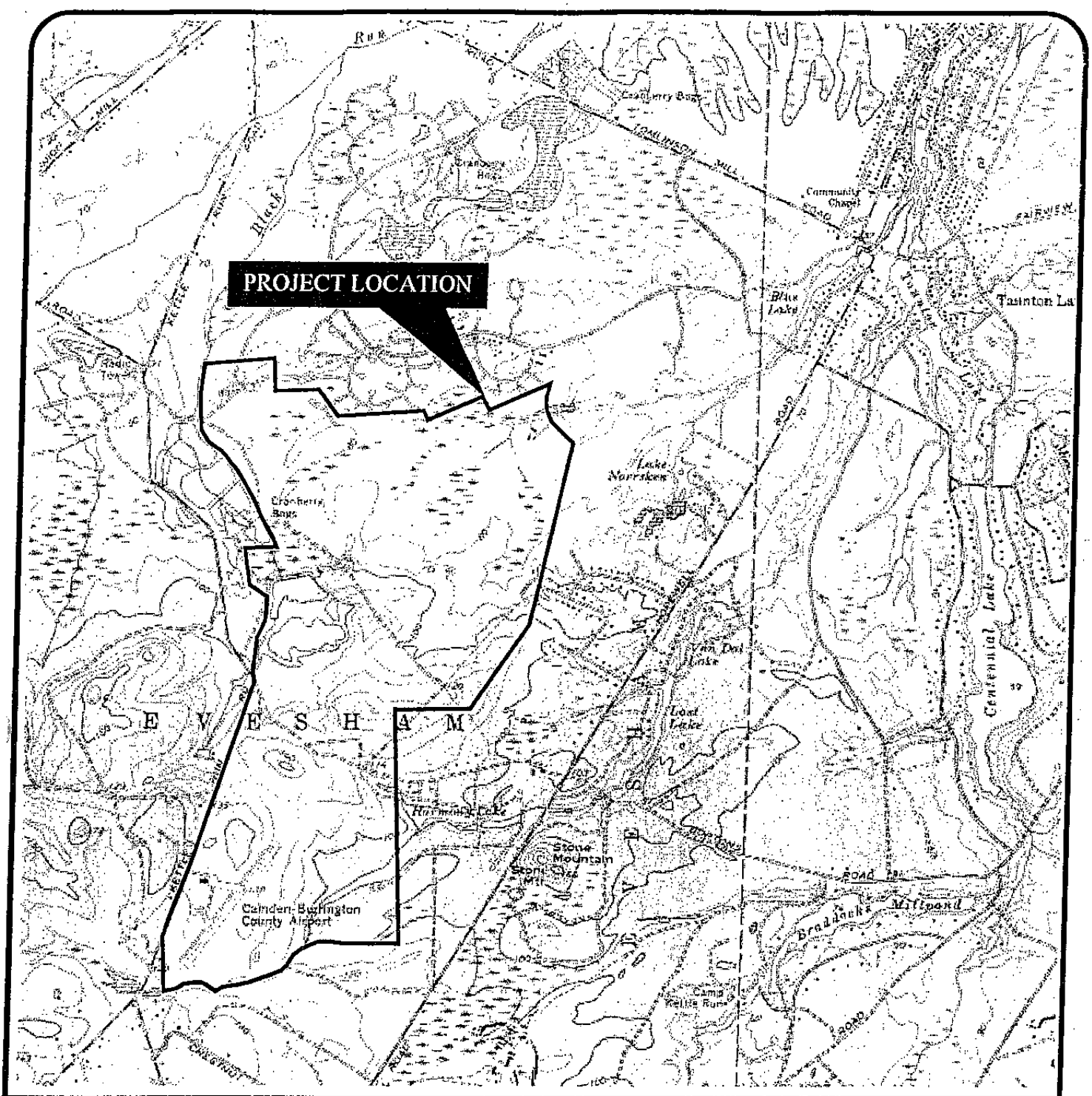
Based on the findings of this investigation the following is concluded:

- The planned applications of fertilizer at the Site are not anticipated to adversely impact groundwater.
- It is unlikely that the pesticides that are to be applied at the Site will leach to groundwater. If the pesticides do leach to groundwater, transport distances from the areas of applications are anticipated to be less than 1000 feet.
- There are no sensitive receptors (shallow domestic wells) located in the apparent down-gradient direction of groundwater flow from the pesticide and fertilizer applications areas.
- The planned applications of pesticides and fertilizers on the athletic field turf grass should not adversely impact domestic wells located near the site.
- The landfill on the adjacent property located south of the Site is properly secured and capped and should pose no risk to the public in conjunction with the planned usage of the Site.

No further investigation of the environmental concerns addressed in this report is warranted and, therefore, no further action is recommended. However, if further investigation is desired to further address public concerns, it would be recommended that the directions of groundwater flow at the Site and in the vicinity to Site be quantitatively evaluated. This investigation could be accomplished by the installation of three to four groundwater monitoring wells at the Site to enable the measurement of groundwater elevations and by measuring groundwater elevations at the locations of selected shallow domestic wells to the south of the Site. Samples could also be collected to enable assessment of baseline conditions. If the findings verify the apparent groundwater flow directions included in this report, there should be no need for further investigation.

APPENDIX A

USGS LOCATION MAP



USGS LOCATION MAP

SOURCE:

CLEMENTON & MEDFORD LAKES
U.S.G.S. QUADRANGLES

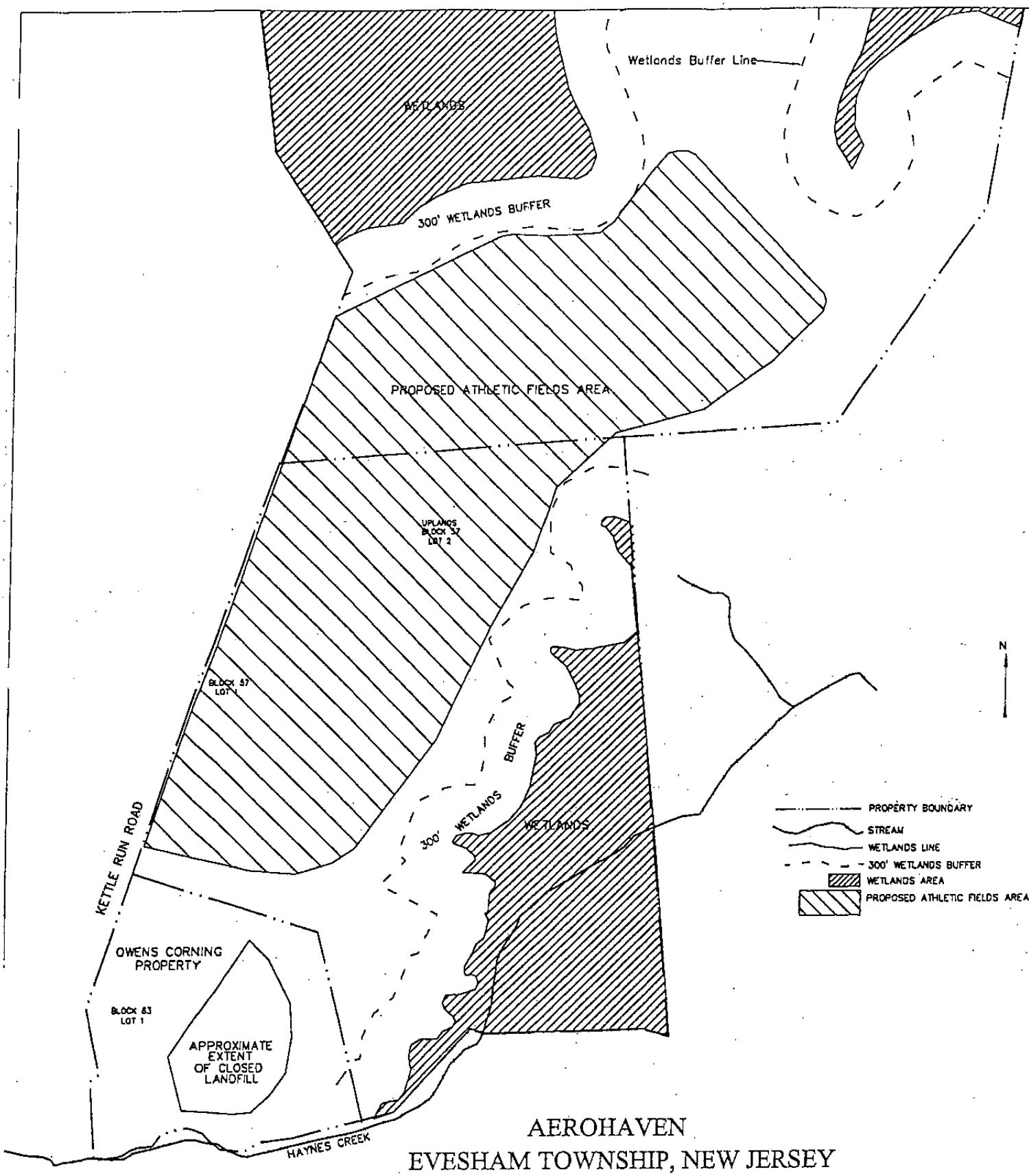
SCALE: 1" = 2000'

AEROHAVEN
EVESHAM TOWNSHIP
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC.

APPENDIX B

SITE PLANS



AEROHAVEN
EVESHAM TOWNSHIP, NEW JERSEY

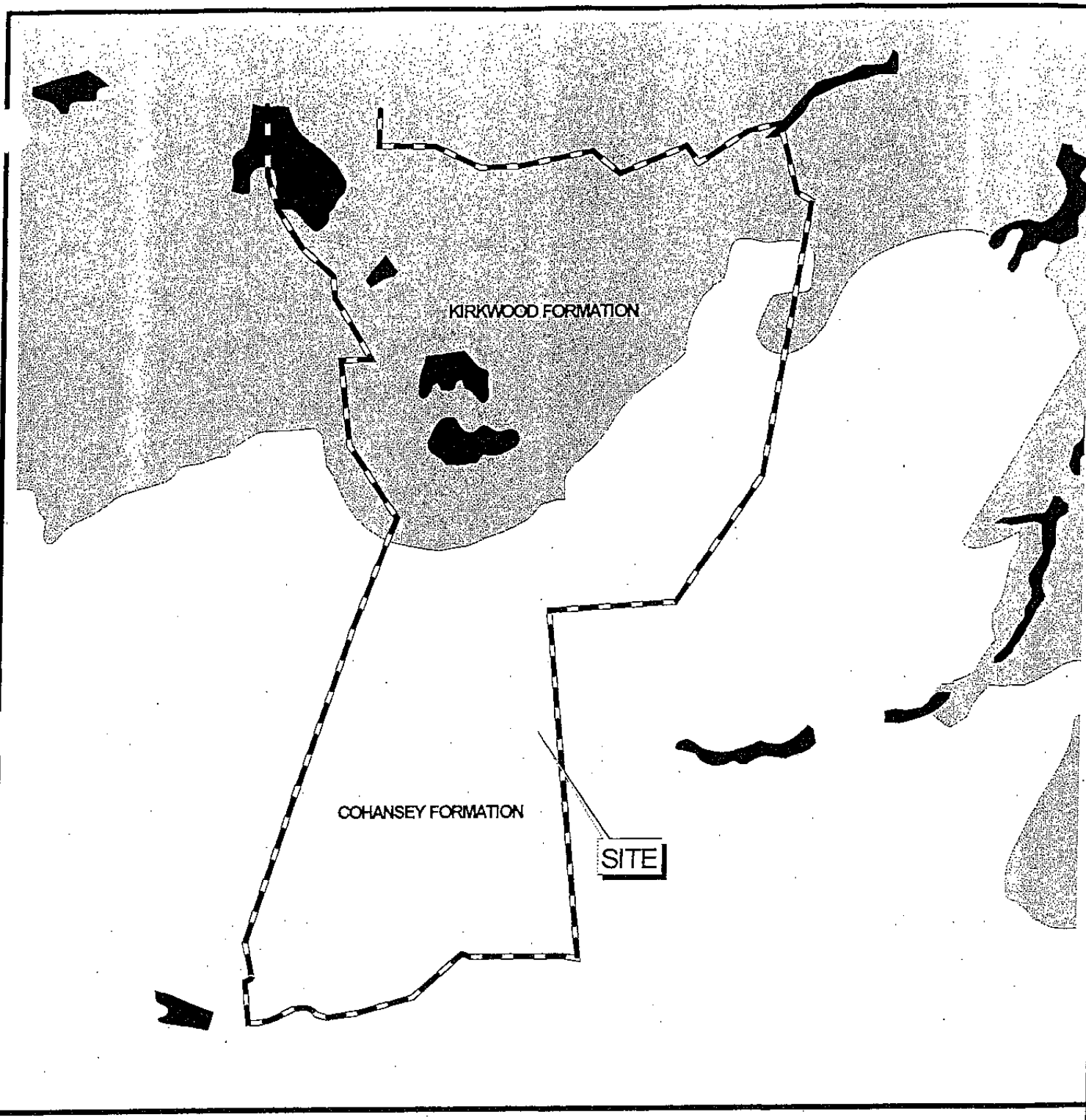
BASE PLAN PREPARED BY:

T&M ASSOCIATES

JANUARY 2000
REVISED FEBUARY 2000
REVISED MARCH 2000

MODIFIED BY:

ENVIRONMENTAL ENGINEERS SCIENTISTS PLANNERS
124 GAITHER DRIVE. SUITE 160
MOUNT LAUREL. NEW JERSEY 08054



GEOLOGIC MAP

SOURCE:
NJDEP CD-ROM
SERIES 1, VOLUME 2

SCALE: 1" = 1,500'

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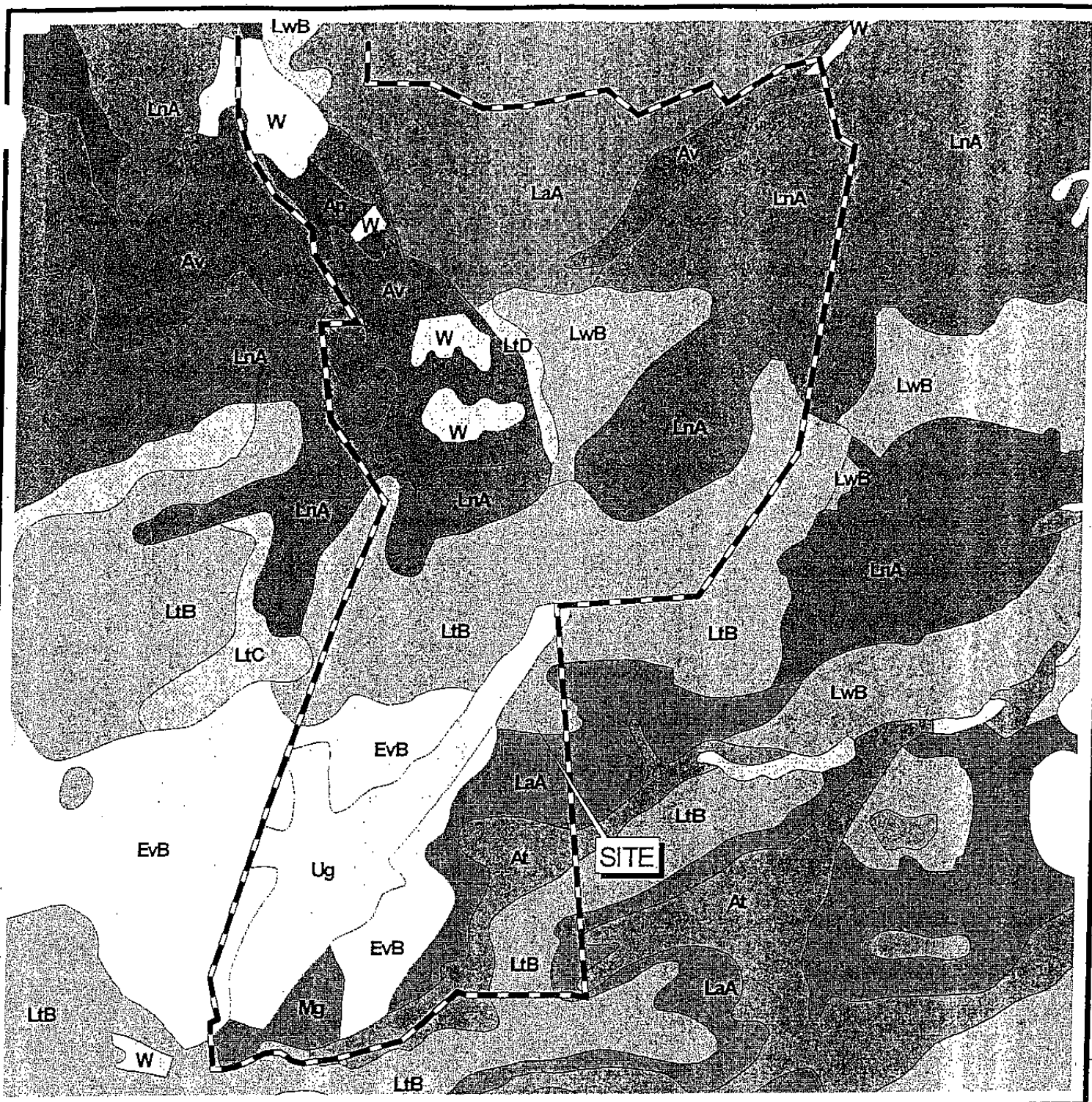

SOILS MAP

SOURCE:

NJDEP CD-ROM
SERIES 1, VOLUME 2

SCALE: 1" = 1,500'

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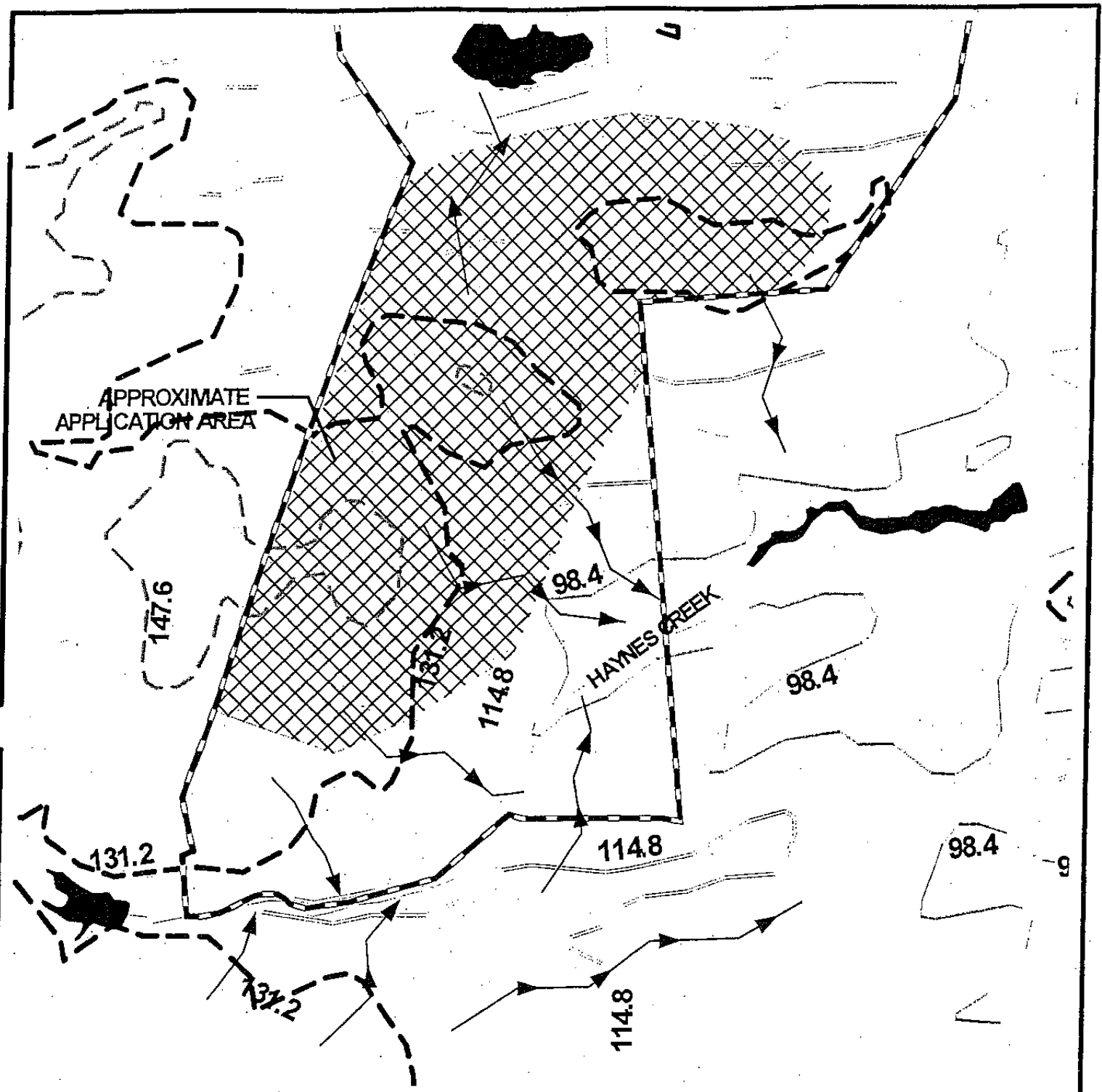

TOPOGRAPHIC MAP

CONTOUR (ELEVATION IN FEET)

EXPECTED GROUNDWATER FLOW DIRECTION

SCALE: 1" = 1,000'

AEROHAVEN
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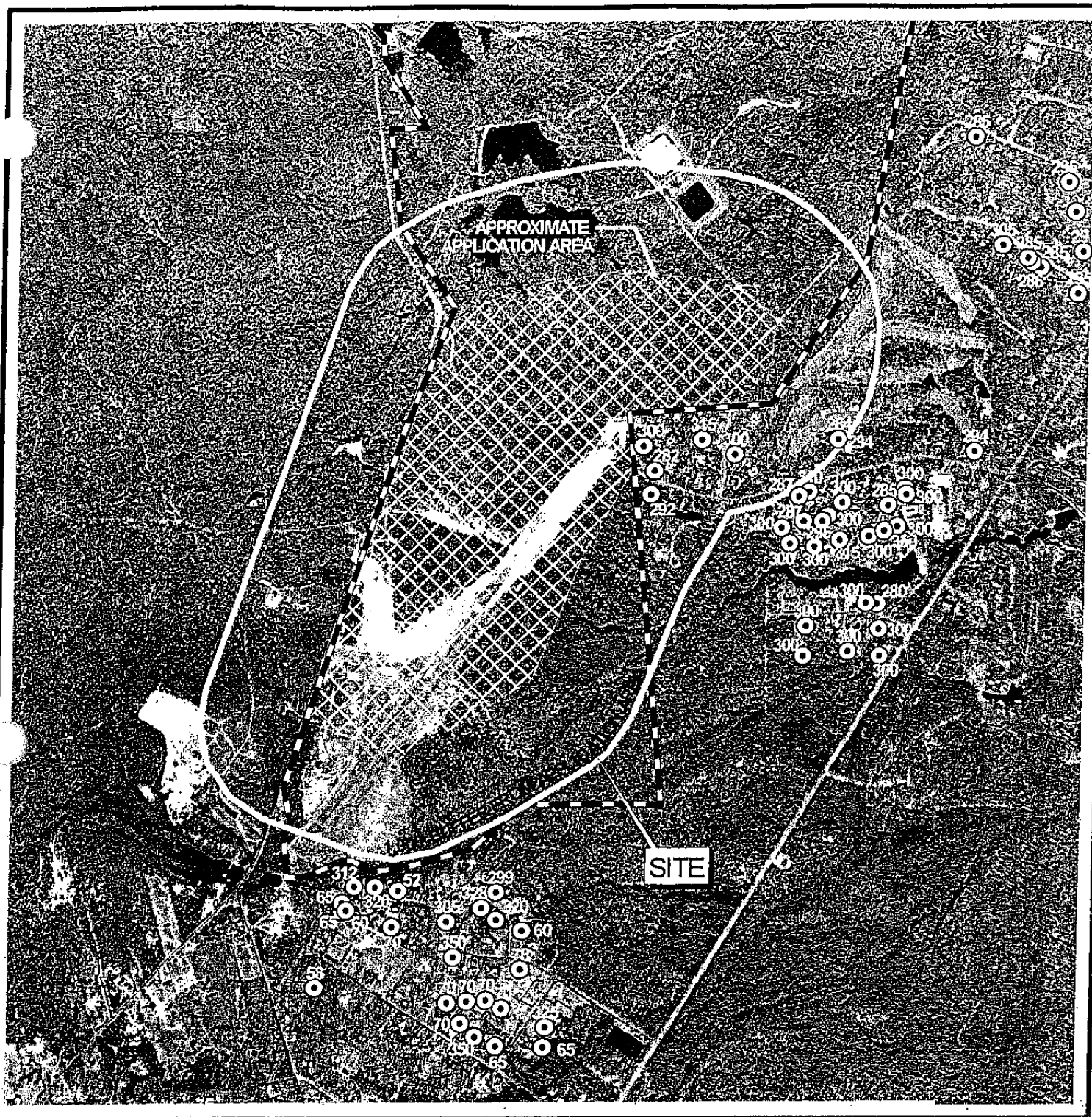
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC.



WELL LOCATION PLAN

SOURCE:
NJDEP CD-ROM
SERIES 3, VOLUME 4
QUADRANGLES: 1042

⊙ WELL LOCATION WITH COMPLETED DEPTH

SCALE: 600 0 600 1200 Feet

AEROHAVEN
EVESHAM TOWNSHIP
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC.

APPENDIX C

WELL LOCATION PLAN

APPENDIX D

WELL TABLE

WELL TABLE

AEROHAVEN, EVESHAM TOWNSHIP

BURLINGTON COUNTY, NEW JERSEY

PERMIT	OWNER	DEPTH	CAPACITY	USE	LOT	BLOCK	DATE	NORTHING	EASTING
3107299	GLATZ, CHARLES	294	10	D	6J	54	7/12/73	362831	386885
3110405	NAUDAIN CONSTRUCTION	60	10	D	10	17A	10/26/76	352519	380124
3111152	GONGLUFF, JACK	60	10	D	1A	85	4/29/77	350962	379915
3111546	DALY, GEORGE	284	15	D	6G	54	7/27/77	362945	385613
3113040	REGINA CONSTRUCTION	305	10	D	10	54-E	2/28/78	387268	364663
3113043	REGINA CONSTRUCTION	295	10	D	4	54E	2/28/78	364310	387821
3113537	REGINA CONSTRUCTION	300	10	D	3	54E	5/9/78	364240	387941
3113642	VON ISTANDOL MATTHEW	266	10	D	3	55	5/26/78	363904	389608
3113817	REGINA CONSTRUCTION	285	10	D	7	54E	6/15/78	364549	387477
3114155	REGINA CONSTRUCTION	286	10	D	8	54E	9/6/78	364598	387388
3114156	REGINA CONSTRUCTION	285	10	D	9	54E	9/6/78	364638	387348
3114206	REGINA CONSTRUCTION	174	10	D	2	54E	9/14/78	364235	388079
3114589	PLUMMER, CLIFF	52	10	D	10	81P	12/4/78	354211	378906
3114658	MACCARELLA, ANTHONY	87	10	D	6	64	12/21/78	355457	382764
3115270	REGINA CONSTRUCTION	305	10	D	12	54E	2/13/79	364758	387114
3115271	REGINA CONSTRUCTION	310	10	D	1	54E	2/13/79	364110	387980
3115272	REGINA CONSTRUCTION	310	10	D	2	57.01	2/13/79	362450	385345
3120503	COLLECTIVE FEDERAL	294	15	D	6T	54	8/8/83	362945	385613
3120912	CHESMORE CONSTRUCTION	385	10	D	11	54B	12/5/83	365407	387907
3121041	DECERBO, JOSEPH	328	15	D	5	6604	12/5/83	358513	382358
3121111	STOKES, JEFFERY	350	10	D	14	6603	3/3/84	358049	382101
3121582	LITTLE MILL LAKES CO	285	10	D	5	5701	4/26/84	362321	386097
3121583	LITTLE MILL LAKES CO	287	10	D	1	5701	4/26/84	362410	385246
3121593	RODRIGO, RUTH A.	305	10	D	3	6604	4/26/84	358385	382032
3121595	T.A. RODGERS CONS. C	350	10	D	3	6603	4/26/84	357297	382319
3121741	COUNTRY CLUB LAKES C	287	10	D	9	5701	6/30/84	362173	385296
3121747	COUNTRY CLUB LAKES C	315	10	D	7	5702	6/30/84	361995	385642
3121749	COUNTRY CLUB LAKES C	300	10	D	9	5702	6/30/84	361965	385167
3122412	KOWALCZYK, JERRY	63	10	R	6	81-B	12/20/84	351738	379599
3122856	SCAFIDI, CHRIS	80	10	D	5	65	4/10/85	356219	382071
3123347	COUNTRY CLUB LAKES C	300	10	D	6	5701	7/18/85	362282	368057
3123348	COUNTRY CLUB LAKES C	300	10	D	7	5701	7/18/85	262252	385909
3123350	COUNTRY CLUB LAKES C	300	10	D	2	5702	7/18/85	362480	386255
3123354	COUNTRY CLUB LAKES C	300	10	D	6	5702	7/18/85	362034	385919
3123355	COUNTRY CLUB LAKES C	300	10	D	8	5702	7/18/85	361936	385404
3123356	COUNTRY CLUB LAKES C	300	10	D	10	5702	7/18/85	362114	385088
3123467	WITTMAN DEVELOPMENT	300	10	D	13	5401	7/22/85	362806	384633
3123652	COUNTRY CLUB LAKES C	300	10	D	1718	5701	9/20/85	362351	385662
3124330	POWERS, ROBERT & ARLE	290	20	D	6R	54	1/10/86	365073	387790
3124372	WITTMAN DEVELOPMENT	65	10	D	1	6603	2/6/86	357208	382516
3124373	WITTMAN DEVELOPMENT	70	10	D	4	6603	2/6/86	357425	382180
3124374	WITTMAN DEVELOPMENT	70	10	D	5	6603	2/6/86	357633	382239
3124375	WITTMAN DEVELOPMENT	70	10	D	6	6603	2/6/86	357643	382417
3124376	WITTMAN DEVELOPMENT	70	10	D	7	6603	2/6/86	357564	382566
3124377	SHAWNEE BUILDERS, INC	65	10	D	21	6603	2/6/86	358484	381033
3124378	SHAWNEE BUILDERS, INC	70	10	D	19	6603	2/6/86	358335	381517
3124824	COUNTRY CLUB LAKES C	300	10	D	7	5703	5/6/86	361184	385335
3124825	COUNTRY CLUB LAKES C	300	10	D	10	5703	5/6/86	361154	386027
3125051	UNGNADY, DENNIS & BA	315	15	D	9	54	6/24/86	362944	384326
3125132	COUNTRY CLUB LAKES C	300	10	D	4	5702	7/2/86	362123	386186

WELL TABLE
AEROHAVEN, EVESHAM TOWNSHIP
BURLINGTON COUNTY, NEW JERSEY

PERMIT	OWNER	DEPTH	CAPACITY	USE	LOT	BLOCK	DATE	NORTHING	EASTING
3125135	COUNTRY CLUB LAKES C	300	10	D	3	5702	7/2/86	362424	386265
3125136	COUNTRY CLUB LAKES C	300	10	D	8	5701	7/2/86	362222	385523
3125596	GALLAHER CONSTRUCTION	78	10	D	11	66.03	9/18/86	357930	382734
3125853	HENRY, ROBERT	295	10	R	8	5701	11/20/86	362173	385474
3126778	NORCROSS, DONALD	65	10	D	3	66.02	6/3/87	357198	382952
3126812	BRUZUSZAK, MICHAEL	299	15	R	30	66.03	6/15/87	358662	382497
3127762	FERRARA, MIKE	295	10	G	6	54.C	11/13/87	365348	387719
3127765	SHAWNEE BUILDERS, INC	65	10	D	21	66.03	11/10/87	358563	381033
3128175	FORANT, JIM	320	10	R	23	66.03	2/29/88	358711	381349
3128216	EVESHAM MUA	235	200	T	5	52	3/3/88	368483	381577
3128253	SCHRAMM, DAVE	292	11	D	3A-4	57	3/9/88	362430	383852
3128345	CABRAL, RONALD	325	10	R	5	66.02	3/23/88	357386	382971
3128504	LEWIS, GEORGE MR.	60	10	R	23	81D	5/12/88	352688	379163
3128517	LITTLE MILL LAKES CO	300	10	D	1	5703	4/26/88	360897	386037
3129037	MEYER, BOB (COMM.)	285	11	D	3K	55	7/21/88	364240	388362
3129173	MEDVEK, FRANK & LIND	60	10	R	21	66.03	8/16/88	358494	381072
3133786	POND & SPITZ BUILDING	340	10	D	09	58.03	4/17/90	361629	388985
3134710	VITOLO, CARMINE A.	58	11	G	8-9-1A	65	8/23/90	357765	380791
3135405	DUESTCH, HERB	273	10	1	8	53.1	11/20/90	367731	389454
3136020	EVESHAM COUNTRY CLUB	332	11	D	5	58.05	2/15/91	361421	389202
3136543	POND & SPITZ BUILDING	320	10	D	1	58.03	5/3/91	363360	390132
3136544	POND & SPITZ BUILDING	320	10	D	2	58.03	5/3/91	363113	389934
3138292	EVESHAM MUA	300	400	T	14	58.03	1/10/92	362064	389024
3138610	EVESHAM COUNTRY CLUB	332	11	D	25	58.02	3/3/92	361490	388648
3138619	EVESHAM COUNTRY CLUB	320	11	D	5	58.03	3/3/92	362677	389687
3138621	EVESHAM COUNTRY CLUB	320	11	D	7	58.04	3/3/92	362410	389667
3138686	EVESHAM COUNTRY CLUB	320	11	D	8	58.04	3/12/92	362489	389806
3138984	PAUL FARMS CONST. CO	265	10	D	1	53.02	4/30/92	367219	388117
3138985	PAUL FARMS CONST. CO	300	10	D	2	53.02	4/30/92	367106	388048
3138986	PAUL FARMS CONST. CO	300	10	D	3,3.01	53.02	4/30/92	367288	388239
3139009	PAUL FARMS CONST. CO	300	10	D	7&7.01	53.02	4/28/92	366915	388233
3136034	PAUL FARMS CONST. CO	300	10	D	8	53.02	4/30/92	366845	388855
3139048	POND & SPITZ BUILDING	320	10	D	6	58.04	5/5/92	362114	389280
3139051	POND & SPITZ BUILDING	320	10	D	8	58.03	5/5/92	362340	389237
3140001	EVESHAM COUNTRY CLUB	320	11	D	3	58.03	9/3/92	362852	389793
3141357	EVESHAM COUNTRY CLUB	320	11	D	6	58.05	4/15/93	361403	389029
3141358	EVESHAM COUNTRY CLUB	320	11	D	7	58.03	4/15/93	362444	389324
3141392	LANGE, GEORGE	60	10	1	33	66.3	4/21/93	358295	382744
3141434	EVESHAM COUNTRY CLUB	320	11	D	6	58.03	4/27/93	362479	389411
3141435	EVESHAM COUNTRY CLUB	320	11	D	7	58.05	4/27/93	361446	388872
3141682	SOL LUBIN / BOB MEYER	292	15	D	3K-1	55	6/3/93	364215	388299
3141824	TROUTMAN, DOROTHY	290	15	G	22	54B	6/22/93	365760	388499
3142398	KIND, RICHARD MR.	292	11	I	5	54.B	8/30/93	364701	387865
3144063	BOB MEYER COMMUNITIES	332	11	D	4	58.03	5/24/94	362661	389680
3144664	BOB MEYER COMMUNITIES	332	11	D	12	58.03	8/15/94	362271	388560
3145355	BROWN, BILL	52	10	I	24	66.3	11/14/94	358677	381572
3146507	DEGIACOMO, KEN	370	25	I	6	81-5	4/20/95	353347	378812
3146705	BLUM, STEWART	285	15	I	13	54C	5/10/95	365769	386841
3146873	LIBBY, ERIC	75	10	I	12	81.13	5/30/95	356533	379775
3147909	ALISON PAUL BUILDERS	330	16	D	5	57.02	10/4/95	362080	386060

WELL TABLE

AEROHAVEN, EVESHAM TOWNSHIP

BURLINGTON COUNTY, NEW JERSEY

PERMIT	OWNER	DEPTH	CAPACITY	USE	LOT	BLOCK	DATE	NORTHING	EASTING
3148793	HARVEY, ROBERT & CAR	300	20	D	4	57.03	3/5/96	360899	385313
3149071	YOUNG, WILLIAM & DEB	300	15	D	2	57.03	4/15/96	360942	385739
3149318	ULLMAN, HEIDI	282	15	I	3	54A	6/3/96	362653	383881
3149508	TREMBLE, SUSAN	300	15	D	5	53.02	7/2/96	366585	388230
3149700	RUHLE, JOHN	312	15	I	22	66.03	8/5/96	358720	381147
3150244	C & M PARTNERSHIP / CI	280	15	D	13	57.02	10/23/96	361394	386008
3151044	DIOBILDA, NICHOLAS	280	10	I	6	54-D	3/21/97	365873	388699
3151909	SHARPE, ROBERT	70	15	I	4	66	7/21/97	357618	382049
3152125	O'CONNOR, GEORGE	70	12	I	14	81.14	8/18/97	355682	379949
3152461	REYNOLDS, JO ANN	300	20	I	5	54.01	10/15/97	362887	383777
3152673	DECERBO, CINDY LUCEY	320	10	D	6	66.04	11/25/97	358399	382501
3153408	TARABORELLI, GLORIA	300	22	D	14	57.02	4/21/98	361403	385904
	KING'S GRANT WATER CO.	597	17	P					
3155740	KALE & BERARD BUILDERS, IN	190	20	D	30	41	9/7/99	369632	380296
3153607	MICHNIOWSKI, PAUL	290	20	I	9	57.02	5/26/98	361967	385157
3153430	MCGOURLEY, LORRAINE	280	30	I	1	54D	5/13/98	365708	388985

WELL USES
D - DOMESTIC
R - REPLACEMENT DOMESTIC
P - PUBLIC
I - REPLACEMENT DOMESTIC

APPENDIX E

MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
AGRICULTURE DIVISION
P.O. Box 4913, Hawthorn Road
Kansas City, Missouri 64120-0013
(816) 242-2000

APPROVAL DATE 09/23/94
SUPERSEDES 07/20/94

TRANSPORTATION EMERGENCY
CALL CHEMTREC ..... : 800-424-9300
DISTRICT OF COLUMBIA ..... : 202-483-7616

NON-TRANSPORTATION
BAYER EMERGENCY RESPONSE ..... : (800) 414-0244
BAYER CUSTOMER SERVICE ..... : (800) 842-2020

I. PRODUCT IDENTIFICATION

PRODUCT NAME ..... : MERIT 75 WP Insecticide
PRODUCT CODE ..... : 216511
EPA REGISTRATION NO. ..... : 3125-421
CHEMICAL FAMILY ..... : Chloronicotinyl
CHEMICAL NAME ..... : 1-[(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine
SYNONYMS ..... : Imidacloprid; BAY NTN 33893
FORMULA ..... : C9 H10 Cl N5 O2

II. HAZARDOUS INGREDIENTS

INGREDIENT NAME / CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
Imidacloprid 138261-41-3	OSHA ....: Not Established ACGIH ....: Not Established	75%

Ingredient 1568
Specific chemical identity is withheld as a trade secret.
OSHA ....: Not Established 3-5%
ACGIH ....: Not Established

Ingredient 1511
Specific chemical identity is withheld as a trade secret.
OSHA ....: Not Established 10-20%
ACGIH : Not Established

III. PHYSICAL PROPERTIES

PHYSICAL FORM ..... : Powder Solid
COLOR ..... : Light brown
ODOR ..... : None
MOLECULAR WEIGHT ..... : 255.7 (for imidacloprid)
pH ..... : 1% Slurry pH 5-8
BOILING POINT ..... : Not established
MELTING/FREEZING POINT ..... : Melting: 120-134 C (for imidacloprid)
SOLUBILITY IN WATER ..... : 5-10% of the mixture
SOLUBILITY (NON AQUEOUS) ..... : Much of the mixture is soluble in acetone, methylene chloride and DMF
SPECIFIC GRAVITY ..... : Not established
BULK DENSITY ..... : Tapped bulk density is approximately 20 lbs/cu.ft
% VOLATILE BY VOLUME ..... : Not applicable
% VOLATILE BY WEIGHT ..... : Not applicable
EVAPORATION RATE ..... : Not established (Butyl acetate = 1)
VAPOR PRESSURE ..... : 1.5 x 10-9 mm @ 20 C (for imidacloprid)
VAPOR DENSITY ..... : Not established (Air = 1)
NITROGEN CONTENT ..... : Approximately 20%

IV. FIRE AND EXPLOSION DATA

FLASH POINT ..... : Not applicable
FLAMMABLE LIMITS:
UPPER EXPLOSIVE LIMIT (UEL) (%) ..... : Not established
LOWER EXPLOSIVE LIMIT (LEL) (%) ..... : Not established
EXTINGUISHING MEDIA ..... : Water; Carbon Dioxide; Dry Chemical; Foam

SPECIAL FIRE FIGHTING PROCEDURES ..... : Keep out of smoke. Cool exposed containers with water spray. Fight fire from upwind position. Use self-contained breathing equipment. Contain runoff by diking to prevent entry into sewers or waterways. Equipment or materials involved in pesticide fires may become contaminated.

V. HUMAN HEALTH DATA

ROUTE(S) OF ENTRY ..... : Inhalation; Skin contact; Skin absorption
HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:
ACUTE EFFECTS OF EXPOSURE ..... : No specific symptoms of acute overexposure are known to occur in humans. Animal studies have shown that this material is mildly toxic by the oral and dermal routes. It is minimally irritating to the conjunctiva of the eye but the irritation is reversible within 24 hours. It is a slight dermal irritant, but is not a dermal sensitizer.
CHRONIC EFFECTS OF EXPOSURE ..... : No specific symptoms of chronic overexposure are known to occur in humans.
CARCINOGENICITY ..... : This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE ..... : No specific medical conditions are known which may be aggravated by exposure to this product.

VI. EMERGENCY AND FIRST AID PROCEDURES

FIRST AID FOR EYES ..... : Hold eyelids open and flush with copious amounts of water for 15 minutes. Call a physician if irritation persists or develops after flushing.
FIRST AID FOR SKIN ..... : Remove contaminated clothing. Wash skin with soap and water. Get medical attention if irritation persists. If signs of intoxication (poisoning) occur, get medical attention immediately.
FIRST AID FOR INHALATION ..... : First, remove victim to fresh air or uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention as soon as possible.
FIRST AID FOR INGESTION ..... : If ingestion is suspected, call a physician or poison control center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger, or if available, by administering syrup of ipecac. If syrup of ipecac is available, administer 1 tablespoonful (15 mL) of syrup of ipecac followed by 1 to 2 glasses of water. If vomiting does not occur within 20 minutes, repeat the dose once. Do not induce vomiting or give anything by mouth to an unconscious person.
NOTE TO PHYSICIAN ..... : Treat symptomatically. In case of poisoning, it is also requested that Bayer Corporation, Agriculture Division, Kansas City, Missouri, be notified. Telephone: 800-842-2020 (working hours) or 800-414-0244 (non-working hours).
ANTIDOTES ..... : None.

VII. EMPLOYEE PROTECTION RECOMMENDATIONS

EYE PROTECTION REQUIREMENTS ..... : Goggles should be used when needed to prevent dust from getting into the eyes.
SKIN PROTECTION REQUIREMENTS ..... : Wear long sleeves and trousers to prevent skin contact.
HAND PROTECTION REQUIREMENTS ..... : The use of chemical-resistant gloves to prevent skin contact is recommended as good practice.
RESPIRATOR REQUIREMENTS ..... : Under normal handling conditions no respiratory protection is needed; however, when potential exposure to product dust is excessive, wear a NIOSH-approved respirator for dusts and mists or for pesticides.
VENTILATION REQUIREMENTS ..... : Control exposure levels through the use of general and local exhaust ventilation where needed.
ADDITIONAL PROTECTIVE MEASURES ..... : Clean water should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of the product. Follow all label instructions. Launder clothing after use. Wash thoroughly after handling.

VIII. REACTIVITY DATA

STABILITY ..... : This is a stable material
HAZARDOUS POLYMERIZATION ..... : Will not occur
INCOMPATIBILITIES ..... : None known
INSTABILITY CONDITIONS ..... : Strong exothermal reaction above 200 C (for imidacloprid)
DECOMPOSITION PRODUCTS ..... : Forms: HCl, HCN, CO, NOx

SPILL AND LEAK PROCEDURES

SPILL OR LEAK PROCEDURES.....: Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid breathing dust and skin contact. Avoid generating dust (a fine water spray mist, plastic film cover, or floor sweeping compound may be used if necessary). Use recommended protective equipment while carefully sweeping up spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with soap and water. Rinse with water. Use dry absorbent material such as clay granules to absorb and collect wash solution for proper disposal. Contaminated soil may have to be removed and disposed. Do not allow material to enter sewers, sewers, or other waterways.

WASTE DISPOSAL METHOD.....: Follow container label instructions for disposal of wastes generated during use in compliance with the product label. In other situations, bury in an EPA approved landfill or burn in an incinerator approved for pesticide destruction. Do not reuse container.

X. SPECIAL PRECAUTIONS AND STORAGE DATA

STORAGE TEMPERATURE (MIN/MAX) .....: None/30 day average not to exceed 100 F

SHELF LIFE.....: Not noted

SPECIAL SENSITIVITY.....: Not noted

HANDLING/STORAGE PRECAUTIONS .....: Store in a cool dry area designated specifically for pesticides. Do not store near any material intended for use or consumption by humans or animals.

XI. SHIPPING INFORMATION

TECHNICAL SHIPPING NAME .....: Imidacloprid

FREIGHT CLASS BULK.....: Insecticides, NOI - NMFC 102122

FREIGHT CLASS PACKAGE.....: Insecticides, NOI - NMFC 102127

PRODUCT LABEL .....: Not noted

DOT (HM-181) (DOMESTIC SURFACE)

PROPER SHIPPING NAME.....: Not hazardous or regulated

HAZARD CLASS OR DIVISION .....: Non-regulated

IMO / IMDG CODE (OCEAN)

PROPER SHIPPING NAME.....: Not hazardous or regulated

HAZARD CLASS

DIVISION NUMBER .....: Non-regulated

ICAO / IATA (AIR)

PROPER SHIPPING NAME.....: Not hazardous or regulated

HAZARD CLASS

DIVISION NUMBER .....: Non-regulated

XII. ANIMAL TOXICITY DATA

Only acute studies have been performed on this product as formulated. The active ingredient portion pertains to the technical-grade active ingredient, imidacloprid.

ACUTE TOXICITY

ORAL LD50.....: Male Rat 2541 mg/kg; Female Rat 1858 mg/kg

DERMAL LD50 .....: Male and Female Rat >2000 mg/kg

INHALATION LC50 .....: 4 Hr. Exposure to Liquid Aerosol: Male Rat 2.65 mg/l (analytical); Female Rat 2.75 mg/l (analytical) — 1 Hr. Exposure to Liquid Aerosol (extrapolated from 4 Hr. LC50): Male Rat: 10.6 mg/l (analytical); Female Rat: 11.0 mg/l (analytical)

EYE EFFECTS.....: Rabbit: Only minimal irritation to the conjunctiva was observed with all remainders irritation resolving by 24 hours.

SKIN EFFECTS .....: Rabbit: Slight dermal irritant

SENSITIZATION .....: Guinea Pig: Not a dermal sensitizer.

SUBCHRONIC TOXICITY.....: In a 3 week dermal toxicity study, rabbits were treated with the active ingredient, imidacloprid, at the limit dose level of 1000 mg/kg for 6 hours/day, 5 days/week. There were no local or systemic effects observed at any of the levels tested. The no-observed-effect-level (NOEL) was 1000 mg/kg. In a 4 week inhalation study, rats were exposed to dust concentrations of imidacloprid at 5.5, 20.5 and 181.2 mg/cubic meter for 6 hours/day, 5 days/week. Effects observed at the high concentration included decreased body weight gains, decreased heart and thymus weights, increased liver weights, and induction of the hepatic mixed-function oxidases. Histopathological examinations did not reveal any organ damage or local injury to the respiratory tract. The NOEL was 5.5 mg/cubic meter based on induction of the hepatic mixed-function oxidases.

CHRONIC TOXICITY .....: Dogs were administered imidacloprid for 1 year at dietary concentrations of 500, 600 or 1250 ppm. Due to the lack of significant effects, the high dose was increased to 2500 ppm at 17 weeks for the remainder of the study. Effects observed at the high dose included decreased food consumption, increased liver weights and elevated serum chemistries. The NOEL was 600 ppm. In chronic studies using rats, imidacloprid was administered for 2 years to rats at dietary concentrations of 100, 300, 900 or 1800 ppm. Histopathology examinations revealed an increased incidence of mineralization in the colloid of the thyroid follicles at concentrations of 900 ppm and greater. At 1800 ppm, there were changes in the

CARCINOGENICITY .....: Imidacloprid was investigated for carcinogenicity in chronic feeding studies using mice and rats at maximum levels of 2000 and 1800 ppm, respectively. There was no evidence of a carcinogenic potential observed in either species.

MUTAGENICITY .....: The imidacloprid mutagenicity studies, taken collectively, demonstrate that the active ingredient is not genotoxic or mutagenic.

DEVELOPMENTAL TOXICITY.....: In a teratology study using rats, imidacloprid was administered by oral gavage during gestation at doses of 10, 30 or 100 mg/kg. At the maternally toxic dose of 100 mg/kg, skeletal examinations of the fetuses revealed a slight increase in the incidence of wavy ribs. The NOELs for maternal and developmental toxicity were 10 and 30 mg/kg, respectively. Teratogenic effects were not observed at any of the doses tested. Rabbits were administered imidacloprid during gestation at oral doses of 8, 24 or 72 mg/kg. At the maternally toxic dose of 72 mg/kg, reduced body weights and delayed skeletal ossification were observed in the fetuses. The NOELs for maternal and developmental toxicity were 8 and 24 mg/kg, respectively. Teratogenic effects were not observed at any of the doses tested.

REPRODUCTION.....: In a reproduction study, imidacloprid was administered to rats for 2 generations at dietary concentrations of 100, 350 or 700 ppm. Offspring at 700 ppm, exhibited reduced mean body weights and body weight gain. No other reproductive effects were observed. The maternal and reproductive NOELs were 100 and 350 ppm, respectively.

NEUROTOXICITY.....: In an acute oral neurotoxicity study using rats, imidacloprid was administered as a single dose at concentrations of 42, 151 or 307 mg/kg. Clinical observations and neurotoxicity evaluations were performed over a period of 15 days followed by a neuropathological examination. Deaths attributed to imidacloprid were observed at the high dose within a day of treatment. The NOEL for motor and locomotor activity was 42 mg/kg for males. Females at the low dose exhibited minimal decrease in activity in the figure-eight maze. In a subsequent study, the NOEL for motor and locomotor activity in females was 20 mg/kg. The NOEL for neurotoxicity was 307 mg/kg based on the absence of treatment-related microscopic lesions in skeletal muscle or neural tissue. In a 13-week neurotoxicity study, imidacloprid was administered to rats at dietary concentrations of 140, 683 or 3027 ppm. At the mid- and high dose, effects observed included reductions in body weight and feed consumption, and clinical chemistry findings. Neurobehavioral changes were observed only in males at the high dose. There were no correlative microscopic findings in muscle or neural tissues in any animals at any treatment level. The NOEL for neurotoxicity was 3027 ppm. The overall NOEL was 140 ppm.

XIII. FEDERAL REGULATORY INFORMATION

OSHA STATUS.....: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA STATUS.....: This product is exempt from TSCA Reporting under FIFRA Section 3 (2) (B) (ii) when used as a pesticide.

CERCLA REPORTABLE

QUANTITY.....: No components listed.

SARA TITLE III:

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES.....: None

SECTION 311/312 HAZARD CATEGORIES.....: Immediate Health Hazard

SECTION 313 TOXIC CHEMICALS.....: None

RCRA STATUS .....: If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

XIV. OTHER REGULATORY INFORMATION

NFPA 704M RATINGS:	Health	Flammability	Reactivity	Other
	1	1	1	0

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

Bayer's method of hazard communication is composed of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer Corporation as a customer service.

MATERIAL SAFETY DATA SHEET # 4029

20005 Lake Road, Rocky River, OH 44116
Emergency Phone: LESCO: (216) 333-9250
CHEMTREC: (800) 424-9300

DATE ISSUED: 12/14/93
SUPERSEDES: 09/17/92

I. PRODUCT IDENTIFICATION

Product: LESCO PRE-M 3.3 EC Herbicide Chemical Family: Dinitroaniline
Chemical Name/Synonyms: Pendimethalin, CL92,553

II. PRODUCT INFORMATION: INGREDIENTS

Chemical Name	TLV/TWA		% (by wt.)	CAS#
Pendimethalin: N-(1-ethylpropyl)				
-3,4-dimethyl-2,6-dinitrobenzeneamine	5 mg/m³	37.4	040487-42-1	
Aromatic 200 Solvent	100ppm or 563 mg/m³	52.0	64742-94-5	
Inert Ingredients	ND		10.6	NA

III. PHYSICAL AND CHEMICAL CHARACTERISTICS

Boiling Point: 208 °C
Melting Point: Liquid at room temperature
Vapor Pressure (mm Hg): 5.6 torr@25 °C
Vapor Density (air = 1): ND
Solubility in Water: Emulsifies
pH: 6.0-7.0 for a 2-4% aqueous dispersion

Specific Gravity (water=1): 1.07 ± 0.01 g/ml
Bulk Density (lbs./cu. ft.): NA
Evaporation Rate: 0.014 (n-Butyl Acetate=1)
Percent Volatile: 52%
Appearance and Odor: Dark amber liquid mild aromatic hydrocarbon odor

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point (method Used): 244 °F (Seta Flash) 201 °F (Pensky Martens) Auto Ignition Temperature: 375 °C

NFPA/HMIS RATING:	HEALTH 1	FIRE 1	REACTIVITY 0
Extinguishing Media:	[X] Foam	[] Alcohol Foam	[X] Dry Chemical
	[X] Water Spray	[] Other	[X] CO_2

Special Fire-Fighting Procedures: Wear NIOSH approved positive pressure, self-contained breathing apparatus and full fire protective clothing. Keep unnecessary people away. Use as little water as possible. Use spray or fog. Solid stream may cause spreading. Foam system is preferred because uncontrolled water can spread possible contamination. Prevent run-off from entering drains, sewers or bodies of water. Do not contaminate personnel or equipment or handle broken packages or containers without protective equipment as specified in Special Protection information section. Decontaminate emergency personnel with soap and water before leaving the fire scene. Avoid breathing dusts, vapors and fumes from burning materials. Advise authorities downstream if water source becomes contaminated.

Unusual Fire and Explosion Hazards: This product is a Class III combustible liquid based on its flash points. Storage areas must conform with NFPA 30 and NFPA 70 or local standards, whichever is more stringent.

HEALTH HAZARDS

Primary Route(s) of Entry: Skin, eyes, inhalation, ingestion.

Signs & Symptoms of Exposure

Acute: The acute oral LD_{50} in rats for the combined sexes was shown to be 3956 mg/kg body weight. Indicat that the material is slight to moderately toxic by ingestion in single doses.
The acute dermal LD_{50} in rabbits was shown to be greater than 2200 mg/kg body weight (highest dose tested).

LESCO

PRE - M 3.3 EC Herbicide

An Emulsifiable Concentrate for Use as a Pre-emergent Weed Control in Non-Cropland Areas, Lawns, Turf, and Ornamentals.

ACTIVE INGREDIENT:
pendimethalin, N-(1-ethylpropyl)-3,4-dimethyl-
2,6-dinitrobenzenamine 37.4%
INERT INGREDIENTS: 62.6%
TOTAL 100.0%
(1 gallon contains 3.3 lbs. of pendimethalin)

EPA Reg. No. 34704-1-10404

KEEP OUT OF REACH OF CHILDREN

CAUTION / !PRECAUCION!

!PRECAUCION AL USUARIO: Si usted no lee ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

In case of an emergency endangering life or property involving this product, call collect day or night Area Code 201-635-3100.

FIRST AID

If in eyes: Hold eyelids open and flush with steady, gentle stream of water for 15 minutes. Call a physician if eye irritation persists.

If swallowed: DO NOT induce vomiting. Call a physician or Poison Control Center immediately. For skin contact: Wash thoroughly with soap and water. Call a physician if skin irritation persists.

NOTE TO PHYSICIAN: Because of increased risk of chemical pneumonia or pulmonary edema caused by aspiration of the hydrocarbon solvent, vomiting should be induced only under professional supervision.

See Inside for Additional Precautionary Statements and Directions for Use

PRECAUTIONARY STATEMENTS - HAZARDS TO HUMANS

CAUTION

Causes moderate eye irritation. Harmful if swallowed or absorbed through the skin. Wear goggles or face shield. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Use with adequate ventilation.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for Category C on an EPA chemical-resistance category selection chart.

- long-sleeved shirt and long pants
- chemical-resistant gloves, such as barrier laminate or viton (≥ 14 mils)
- shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

ENVIRONMENTAL HAZARDS

This product is toxic to fish. DO NOT apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites. DO NOT contaminate water when disposing of equipment washwaters.

DISCLAIMER

The label instructions for use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use or application of the product contrary to label instructions, all of which are beyond the control of LESCO, Inc. All such risks shall be assumed by the user.

LESCO Inc. warrants only that the materials contained herein conform to the chemical description on the label and is reasonably fit for the use stated or described when used in accordance with the directions for use, subject to the risk referred to above.

Any damages arising from a breach of this warranty shall be limited to direct

GENERAL INFORMATION

LESCO PRE-M 3.3 EC Herbicide is recommended for pre-emergence control of grasses and certain broadleaf weed species as they germinate on non-cropland areas, ornamentals and established Christmas trees. LESCO PRE-M 3.3 EC Herbicide treatments are most effective in controlling weeds when adequate rainfall is received within 30 days after application.

LESCO PRE-M 3.3 EC Herbicide will not control established weeds. Therefore, areas to be treated should be free of established weeds at the time of treatment, or LESCO PRE-M 3.3 EC Herbicide may be used in conjunction with herbicides registered for post-emergence use in non-cropland areas, ornamentals, and established Christmas trees. Consult the labels of these herbicides for suggested treatment, rates to be used, and precautions or restrictions for use in non-cropland areas.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. This labeling must be in the possession of the user at the time of herbicide application. DO NOT apply this product through any type of irrigation system.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE). This requirement in this box only applies to users of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- coveralls
- chemical-resistant gloves, such as barrier laminate or viton (≥ 14 mils)
- shoes plus socks

STORAGE AND DISPOSAL

Storage: DO NOT STORE BELOW 40°F. Extended storage at temperatures below 40°F can result in the formation of crystals on the bottom of container. If crystallization does occur, store the container on its side at room temperature (70°F) and roll occasionally until crystals redissolve.

DO NOT contaminate water, food, or feed by storage or disposal.

Pesticide Disposal: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, by incineration or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Observe all cautions and limitations on this label and the labels of products used in combination with LESCO PRE-M 3.3 EC Herbicide. The use of LESCO PRE-M 3.3 EC Herbicide not consistent with this label can result in injury to crops, animals, or persons. Keep container closed to avoid spills and contamination.

MIXING INSTRUCTIONS

1. Fill tank one-half to three-quarters full with clean water.
2. Add LESCO PRE-M 3.3 EC Herbicide to the partially filled tank while agitating and then fill the remainder of the tank with water.
3. MAINTAIN CONTINUOUS AGITATION WHILE ADDING LESCO PRE-M 3.3 EC Herbicide AND UNTIL SPRAYING IS COMPLETED. If the spray mixture is allowed to settle for any period of time, thorough agitation is essential to re-suspend the mixture before spraying is resumed. Continue agitation while spraying.

The material was determined to be mildly irritating to rabbit skin and eyes and shown to be a non-skin sensitizer in appropriate guinea pig studies.
Acute inhalation studies in rats demonstrated that the LC_{50} was greater than 5.35 mg/L (actual) of air over a 4 hour exposure period.
Chronic: This material as formulated has not been tested for chronic toxicity, however, the chronic toxicity of Pendamethalin is as follows: Mutagenicity: In an evaluation of data from a battery of six genotoxicity tests, pendimethalin was judged to be nongenotoxic. Teratogenicity: No teratogenic or fetotoxic effects were observed in rats or rabbits. Reproduction: No reproductive effects were observed in a three-generation reproduction study conducted in rats. Oncogenicity: No oncogenic effects were observed at all dosage levels tested in the lifetime (18 months) mouse study. The highest dose tested was 5000ppm in the diet. A marked depression in body weight gain and statistically significant increase in benign thyroid proliferative lesions were observed at the highest dose tested (5000ppm) in the lifetime (24 months) rat study.

Emergency First-Aid Procedures

Eyes: Flush eyes with copious quantities of water for 15 minutes. Get medical attention if irritation persists.
Skin: Wash skin with plenty of soap and water. Get medical attention if irritation persists.
Inhalation: Remove subject to fresh air.
Ingestion: Do not induce vomiting. Get medical attention immediately.
Notes to Physician: Because of the increased risk of chemical pneumonia or pulmonary edema caused by aspiration of aromatic hydrocarbons into the lungs, vomiting should be induced only under professional supervision. Pendimethalin is a strongly orange-red colored compound - virtually an aniline dye. Cases have been described of orange-yellow coloration of the urine following heavy exposure of workers to the dust of this compound. Despite its structure as both a nitro-compound and aromatic amine, exposure to pendimethalin is not associated with methemoglobinemia.
Toxicity Information:
Oral LD_{50}: Acute(rat): 3956 mg/kg Slight to moderate toxicity
Dermal LD_{50}: Acute(rabbit) >2250 mg/kg Slightly toxic
Inhalation LC_{50}: >5.35 mg/L (Rat-4 hr period) Eye Irritation: Mild Skin Irritation: Mild - not a sensitizer

Positive Teratogen or Mutagen Carcinogen(NTP): No Potential Carcinogen (IARC or OSHA): No

VI. REACTIVITY

Stability: [X] Stable [] Unstable
Conditions to Avoid: Do not store below 40°F. Extended storage at temperatures below 40°F may result in the formation of crystals on the bottom of the container. Do not store above 120°F.
Incompatibility: Avoid contamination with strong oxidizing agents and strong alkalies.
Hazardous Decomposition Products: Combustion may produce oxides of carbon and nitrogen.
Hazardous Polymerization: [X] Will not occur [ ] Will occur

VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

If material is spilled: Wearing appropriate protective clothing and equipment, dike spill area to prevent spill from spreading, absorb with an inert absorbent material, (e.g. granular clay or sawdust), and shovel/sweep into covered containers for proper disposal. Rinse spill area and tools several times with soapy water. Contain and absorb rinsate with inert absorbents and place into disposal containers. Depending on the quantity of released into the environment, notifications to regulatory authorities may be required. If spill is to a body of water, immediately notify applicable authorities downstream, so that contingencies can be taken if necessary.
Waste Disposal Method: Dispose according to Federal EPA procedures as outlined in the Resource Conservation Recovery act (RCRA) and follow state and local guidelines. Be certain containers are completely empty before disposal. To avoid disposal, all attempts should be made to utilize the product completely, in accordance with its intended and/or registered use. If this is not possible, handle with care and dispose in a safe manner. Empty containers may retain some product residues. DO NOT REUSE. It is the ultimate responsibility of the waste generator to determine at the time of disposal whether the product (and/or "empty" container residue) meets any hazardous waste criter. Follow all applicable Federal, State, Provincial and Local regulations regarding waste management methods.

VIII. SPECIAL PROTECTION INFORMATION

Protective Equipment Suggested for Outdoor Application:
[X] Impervious Gloves [ ] Dust Mask [ ] Respirator(use NIOSH/MSHA approved)
[X] Impervious Boots [X] Clean Clothing [X] Eye Goggles / Safety Glasses
Protective Equipment Suggested for Confined Areas:
[X] Sufficient Ventilation[ ] Respirator(use NIOSH/MSHA approved) [X] Dust Mask [X] Splash Goggles/ Safety Glasses
[X] Eyewash Station [X] Emergency Shower [X] Impervious Apron

IX. STORAGE AND HANDLING

Precautions: Store in a cool, dry place if possible. Separate from other pesticides, fertilizers, seed, feed, foodstuffs, and away from drains, sewers, and water sources.
Other Precautions: Do not store below 40°F. Not for use or storage in or around the home. Keep away from sources of ignition and protect from exposure to fire and heat. Segregate from oxidizers and incompatible materials listed in the Reactivity Section. This material is a Class III combustible liquid based on its' flash points. Storage areas must conform to NFPA 30 and NFPA 70 or local standards, whichever is more stringent. Store in original containers. Keep containers sealed when not in use.

X. FEDERAL REGULATORY INFORMATION:

SARA TITLE III; SEC. 311/312 HAZARD CATEGORIES
Y Immediate (Acute) Health
N Delayed (Chronic) Health
N Fire
N Sudden Release of Pressure
N Reactivity

SEC 302: N/A
SEC 304: N/A
SEC 313: N/A
CERCLA RQ: N/A
CAA RQ: N/A

EPA Reg. No.: 00241-0341-10404

HM 181 Shipping Name: Not Regulated.

NA = Not Applicable ND = Not Determined

Preparation and distribution of this Material Safety Data Sheet done by LESCO, Inc., 20005 Lake Road, Rocky River, Ohio 44116, pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Riverdale TruPower™

FOR SELECTIVE BROADLEAF WEED CONTROL
IN ORNAMENTAL LAWNS AND TURF GRASSES

CONTAINS MCPA, CLOPYRALID AND DICAMBA

CONTROLS: Dandelion, Chickweed, Black medic, Knotweed, Plantain, Oxalis, Clover, Cocklebur, Thistle and many other species of broadleaf weeds; some of which are listed on this label.

ACTIVE INGREDIENTS:	
Dimethylamine Salt of 2-Methyl-4-Chlorophenoxyacetic Acid*	48.13%
Monoethanolamine Salt of 3,6-Dichloro-2-Pyridinecarboxylic Acid**	5.18%
Dimethylamine Salt of Dicamba (3,6-Dichloro-o-Anisic Acid)***	4.73%
INERT INGREDIENTS:	41.96%
TOTAL	100.00%

By Isomer Specific AOAC Method, Equivalent to:
*2-Methyl-4-Chlorophenoxyacetic Acid ..... 39.30%, 3.75 lbs./gal.
**3,6-Dichloro-2-Pyridinecarboxylic Acid ..... 3.93%, 0.37 lbs./gal.
***3,6-Dichloro-o-Anisic Acid ..... 3.93%, 0.37 lbs./gal.

TruPower™ - Is A Trademark of Riverdale Chemical Company

For Use By Professional Turf Maintenance Personnel, Landscaping or Commercial Applicators Only.
Not For Sale to or Use By Homeowners.

KEEP OUT OF REACH OF CHILDREN

DANGER - PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.

SEE INSIDE BOOKLET FOR ADDITIONAL PRECAUTIONARY STATEMENTS AND STATEMENT OF PRACTICAL TREATMENT

EPA REG. NO. 228-323 EPA EST. NO. 228-IL-1

NET CONTENTS GALS.

MANUFACTURED BY

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER - PELIGRO

Corrosive. This concentrate causes irreversible eye damage. Harmful if swallowed or absorbed through skin. Do not get in eyes, on skin or on clothing. Wear protective eyewear (goggles, face shield, or safety glasses). Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

STATEMENT OF PRACTICAL TREATMENT

IF IN EYES: Hold eyelids open and flush with a steady,gentle stream of water for 15 minutes. Get medical attention.

IF ON SKIN: Wash with plenty of soap and water. Get medical attention.

IF SWALLOWED: Call a doctor or get medical attention. Do not induce vomiting or give anything by mouth to an unconcious person. Drink promptly a large quantity of milk, eggwhites, gelatin solution, or if these are not available, drink large quantities of water. Avoid alcohol.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

ENVIRONMENTAL HAZARDS

Drift or runoff may adversely affect nontarget plants. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. When cleaning equipment, do not pour washwater on the ground; spray or drain over a large area away from wells and other water sources. Do not contaminate water when disposing of equipment washwaters. Do not apply this product through any type of irrigation system. Do not contaminate water used for irrigation or domestic purposes.

Clopyralid, an active ingredient in this product, may leach through soil into groundwater under certain conditions of use. Use of this product where soils are permeable, particularly where the water table is shallow, may result in leaching to groundwater. Caution should be exercised when handling this product at mixing, loading, and disposal sites to prevent contamination of groundwater supplies. Use of closed systems for mixing or transferring this product will reduce the probability of spills. Placement of mixing/loading equipment on an impervious pad to contain spills will help prevent groundwater contamination.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. READ ENTIRE LABEL BEFORE USING THIS PRODUCT. USE STRICTLY IN

TruPower™ SELECTIVE HERBICIDE is for use on Ornamental Turf such as Lawns, Parks, Cemeteries, Golf Courses (Fairways, Aprons, Tees* and Roughs), and similar non-crop areas. Not for use on turf being grown for sale or other commercial use as sod, or for commercial seed production or for research purposes. *Excluding Bentgrass Tees.

USE PRECAUTIONS

Avoid drift of spray mist to vegetables, flowers, ornamental plants, shrubs, trees and other desirable plants. Do not pour spray solutions near desirable plants. Do not use on Centipede, St. Augustine, Dichondra, nor on lawns or turf where desirable clovers are present. Avoid fine mists. Use lawn type sprayer with coarse spray as wind drift is less likely. Avoid contact with exposed feeder roots of ornamentals and trees. Maximum control of weeds will be obtained from Spring or early Fall applications when weeds are actively growing. The degree of weed control and duration of effect will vary with weed size and density, spray rate and coverage, and growing conditions before, during, and after the time of treatment. Use the higher rate for hard-to-control weeds. Do not exceed specified dosages for any area; be particularly careful within the dripline of tree and other ornamental species. Do not apply to newly seeded grasses until well established. Do not spray when air temperature exceeds 90° F.

The suitable use of TruPower on non-recommended turf species may be determined by treating a small area at any rate/acre which does not exceed 3 pints/acre. The treated area should be observed for any sign of turf injury for a period of 30 days of normal growing conditions to determine the phytotoxicity and efficacy to the treated area.

For optimum results: (1) avoid applying during excessively dry or hot periods unless irrigation is used; (2) turf should not be mowed 1 to 2 days before and following application; (3) reseed no sooner than 3 to 4 weeks after application of this product. Adding oil, wetting agent, or other surfactant to the spray may be used to increase effectiveness on weeds but doing so may reduce selectivity to turf resulting in turf damage. Clean and rinse spray equipment using soap or detergent and water, and rinse thoroughly before reuse for other sprays.

WEEDS CONTROLLED BY TruPower™

Alfalfa, Amaranth, Aster, Bachelor button, Beadstraw, Bedstraw, Beggartick, Beggarweed, Bindweed, Bitter sneezeweed, Black medic, Bladder campion, Bracken fern, Broomweed, Buckhorn, Buckwheat, Buffalobur, Burclover, Burcucumber, Burdock, Bursage, Buttercup, Canada thistle, Carpetweed, Catnip, Catsear, Chamise, Chamomile, Chickweed, Chicory, Cinquefoil, Clover, Cocklebur, Coffeeweed, Cornflower, Cornspeedwell, Croton, Daisy, Dandelion, Dock, Dog fennel, Dragonhead mint, Evening primrose, Field pennycress, Fleabane, Florida pusley, Frenchweed, Galinsoga, Geranium, Goatsbeard, Goldenrod, Goosefoot, Gromwell, Ground ivy, Groundsel, Halfshrub sundrop, Hawksbeard, Hawkweed, Kochia, Ladysthumb, Lambsquarter, Lespedeza, Little starwor Locoweed, Mallow, Marc's Tail, Marshelder, Matchweed Mayweed, Milkweed, Morningglory, Mustard, Nightflowerin catchfly, Nightshade, Oxalis(Stricta and corniculata) Parsley-piert, Pennywort, Peppergrass, Pepperweed, Pigweed Plantain, Poison hemlock, Poison ivy, Poison oak, Pokeweed Poorjoe, Prickly sida, Prickly lettuce, Puncturevine, Purslane Ragweed, Red sorrel, Red clover, Redevine, Redstem Rubberweed, Sheep sorrel, Shepherdspurse, sicklepod Smartweed, Snakeweed, Sowthistle, Speedwell, Spiderwort Spikeweed, Spiny, Spurge, Spurry, Spurweed, Starbur Stinging nettle, Stitchwort, Stunkweed, Sumpweed, Sunflower Tansy ragwort, Teasel, Teaweed, Texas blueweed, Thistle Toadflax, Trumpetcreeper, Velvetleaf, Veronica, Vetch Waterhemlock, Waterhemp, Whitebrush, Wild radish, Wild onion, Wild astser, Wild carrot, Wild garlic, Wild geranium, Wood sorrel, Wormwood, Yankeeweed, Yarrow, Yellow starthistle, Yellow rocket, and many other broadleaf weeds.

ORNAMENTAL LAWNS AND TURF

Apply TruPower Selective Herbicide at the rate of 2 to 3 pints in 20 to 240 gallons of water per acre (0.73 to 1.10 fl. oz. in 0.5 to 5.5 gallons of water per 1,000 square feet) to control weeds growing in turf planted to Bluegrass, Fescue, Rye, Beni (excluding golf course greens and tees), Bahia, Bermuda and Zoysia.

Herbi Controlled Droplet Applicator: Add 1-1/2 to 2-1/4 pints of TruPower to the 5 pint Herbi bottle, then fill with water to make 5 pints of mixture or substitute 1/2 pint of a surfactant for water while agitating the solution.
While walking at approximately 1 pace (3 feet) per second, spray entire contents over 33,000 square feet (3/4 of an acre). Do not overlap (double coverage) at edge of spray patterns. Reduced rates (use 1/2 of rate shown above) of TruPower must be applied when grass is stressed from heat, drought, etc.
Herbi™ is a trademark of North American Micron.
Controlled Droplet Applicators - (CDA), Atomizers, and Spinning Disk Applicators: Use TruPower at the rate of 2 to 3 pints per acre (0.73 to 1.10 fluid ounces per 1,000 square feet) in sufficient water to assure coverage (1 too 4 gallons of water per acre is normal for this type of equipment).
Lower Volume Equipment: Use as little as 5 gallons of water per acre. Use only application equipment that is capable of spreading a uniform droplet, wetting each weed surface.
NOTE: For all grasses (1) Do not overlap spray patterns; (2) Use reduced rates if grass is stressed from heat, drought, etc.; and (3) Follow CDA equipment spray instructions.

COMPATIBILITY

TruPower can be mixed with some liquid fertilizers or liquid iron materials. Because liquid fertilizers and liquid iron differ in pH, free ammonia content, density, salt concentration and percentage of water, a compatibility test (given below) is recommended prior to mixing in the application equipment. All regulations, either State or Federal, relating to the application

1. Pour 18 ounces of water into a quart jar.
2. Add 1 ounce of either the liquid fertilizer or liquid iron to be used.
3. Add 1 ounce of TruPower.
4. Close jar and shake well.
5. Watch the mixture for several seconds after shaking and check again after 30 minutes.
6. If the mixture does not show signs of separating, the combination may be used. If the mixture foams excessively, gels, separates or gets very thick, do not combine for field application.
7. Compatibility may be improved by the use of a compatibility agent. Some suggested compatibility agents to try are Kalo Laboratories Complex, Hopkins Chemical's Unite, Farm Chemicals Inc.'s Compat, Harcros Chemicals' T-Mulz 734-2, Rigo Company's Rigo Compatibility Agent, Witco Chemical's Sponto 168D, Amoco Oil's Amoco Spray Mate and Universal Coop.'s Chem-Link. These agents are all used in the same manner. Follow the previously outlined test procedures and add 1/6 ounce of the compatibility agent between steps (the compatibility agent must be added to the fertilizer or iron before adding the TruPower.
8. If the mixture does not separate, gel, foam or get very thick, it may be used for field application. Mix only the amount to be sprayed. Do not allow to stand overnight.

STORAGE AND DISPOSAL

STORAGE: Always use original container to store pesticides in a secured warehouse or storage building. Do not store near open containers of fertilizers, seeds or other pesticides. Store at temperatures above 32 F. If allowed to freeze, remix before using. This does not alter this product. Containers should be opened in well ventilated areas. Keep container tightly sealed when not in use. Do not stack cardboard cases more than two pallets high. Do not contaminate water, food or feed by storage or disposal.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. If container is damaged or if pesticide has leaked, contain all spillage. Absorb and clean up all spilled material with granules or sand. Place in a closed labeled container for proper disposal. Improper disposal of excess pesticide, spray mixtures, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Triple rinse (or equivalent), adding rinsate to spray tank. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

CONTAINER DISPOSAL FOR REFILLABLE CONTAINERS: Close all openings and replace all caps. Contact Riverdale Chemical's Customer Service Department at 1-708/754-3330, to arrange for return of the empty refillable container.

WARRANTY

Riverdale warrants that this herbicide conforms to the chemica description on its label. When used in accordance with labe directions under normal conditions, this herbicide is reasonabl fit for its intended purposes. Since timing, method o application, weather, plant and soil conditions, mixtures wit other chemicals and factors affecting the use of this produc are beyond our control, no warranty is given concerning th use of this product contrary to label directions or unde conditions which are abnormal or not reasonably foreseeable. The user assumes all risks of any such use, including the use of this product on turf species not recommended on this label (PR938&11 042194/RV 120897)

MOYER & SON, INC.
113 EAST RELIANCE ROAD
SOUDERTON, PA 18964
(215) 723-6001

CHEMTREC
(24 HR. EMERGENCY ASSISTANCE)
(800) 424-9300

MATERIAL SAFETY DATA SHEET

TurFlo Fertilizer

17-2-5 (100% UN)

SECTION I

Product:	TurFlo Fertilizer
Chemical/Synonyms:	Urea, Ammonia Poly Phosphate, Potash Fertilizer
Formula:	Mixture CAS# NE Mixture*

SECTION II - PHYSICAL DATA

Boiling Point:	212 F 100 C
Specific Gravity:	1.236 @ 15 C
Vapor Pressure (mmHg):	Not determined
Percent Volatile by Volume %:	N/A
Vapor Density (air=1):	N/A
Evaporating Rate:	Not determined
Solubility in Water:	Complete
Appearance and Odor:	Colorless, Amber to Green Liquid

SECTION III - FIRE AND EXPLOSION HAZARD DATA

Flash Point (method used):	1750 954 C (closed cup)
Autoignition Temperature:	Not determined
Flammable Limits (% by Volume):	N/A
Extinguishing Media:	Water Spray (Fog), Water (Non-flammable)
Special Fire Fighting Procedures:	Use self-contained breathing apparatus with full facepiece operated in pressure demand or other positive pressure mode.
Unusual Fire and Explosion Hazards:	Vapors are heavier than air and may travel along the ground or be moved by ventilation to locations distant from material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.

SECTION IV - HEALTH HAZARD DATA

Threshold Limit (ACGIH):	Not established
Permissible Exposure Limit (OSHA):	Not established
Effects of Overexposure:	Can cause skin irritation, defatting of skin or dermatitis. Severe eye irritation and blurred vision may be caused by eye contact. Inhalation of vapor can cause nasal irritation, dizziness, weakness, nausea, possible unconsciousness and asphyxiation. Ingestion causes gastrointestinal irritation, nausea, vomiting, diarrhea.

Emergency and First Aid Procedures:

Skin Contact:	Wash thoroughly with soap and water. Remove contaminated clothing and do not re-use before laundering.
Eye Contact:	Flush with large amounts of water, at least 15 minutes until irritation stops. Contact physician.
Inhalation:	Remove person from source of exposure into fresh air. If breathing has stopped, apply artificial respiration. Contact physician.
Ingestion:	Give 2 to 3 glasses of water, induce vomiting. Contact physician. NEVER give anything by mouth to an unconscious person.